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DEFENSE AND THE ECONOMY ANNEX C TO ADJUSTING TO THE DRAWDOWN REPORT OF THE DEFENSE CONVERSION COMMISSION

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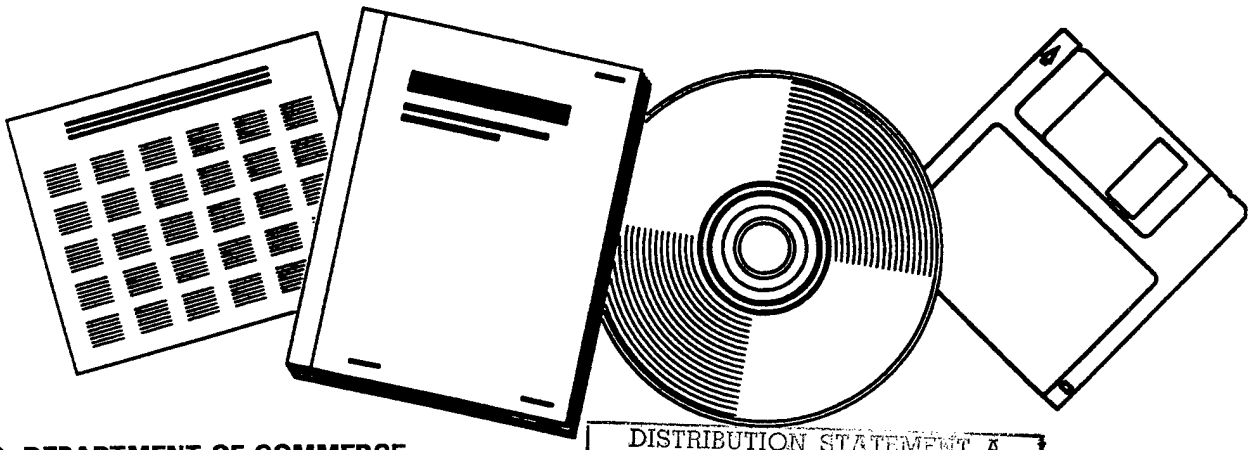

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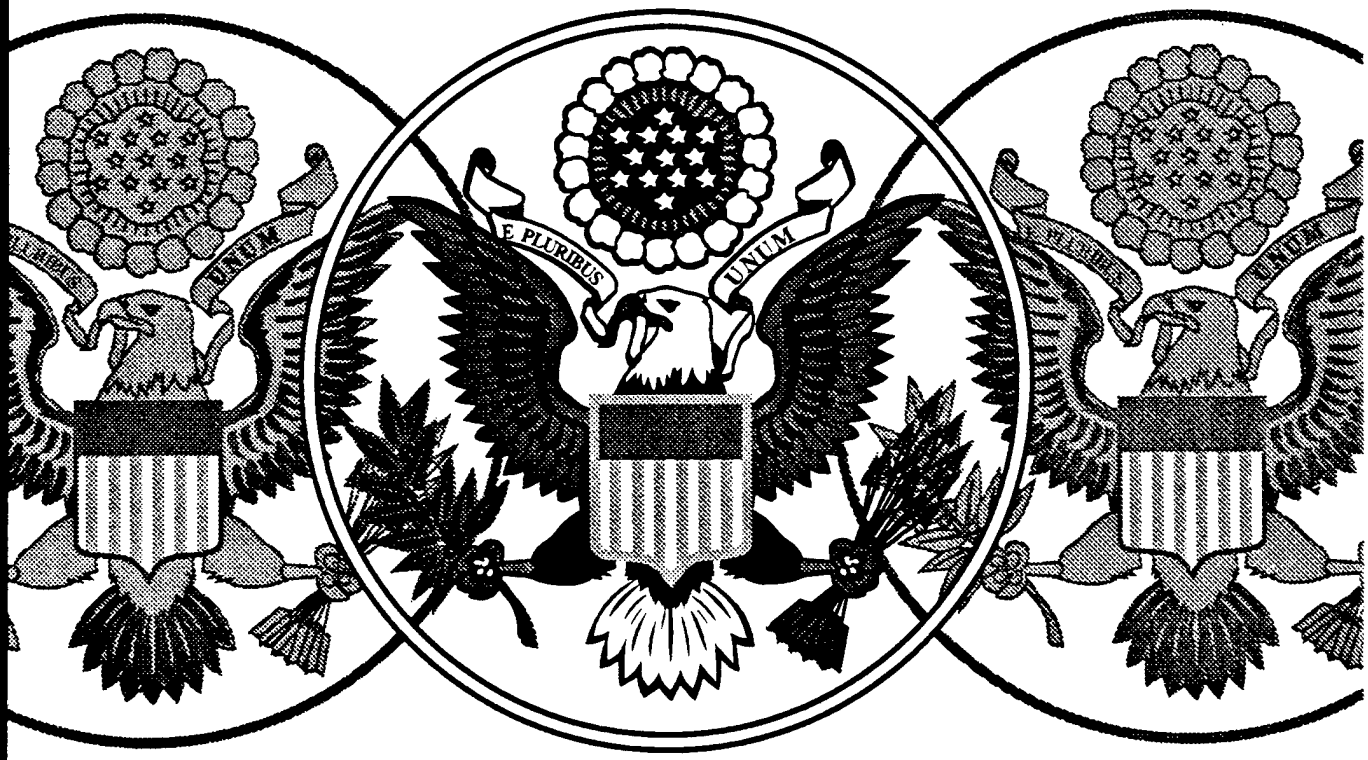
Defense and the Economy



Annex C to
Adjusting to the Drawdown

Report of the
Defense Conversion Commission

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Authors: D. R. Graham, A. J. Tai, and B. Bicksler.

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Abstract: The report examines the influence of the defense budget drawdown on the nation's economy, and assesses the adequacy of government programs that assist conversion. The purpose of the study is to estimate the long-term benefits and the near-term transitional costs of the drawdown, and to show how these depend on the way the peace dividend is spent. It begins by describing the defense drawdown. It next examines three alternative uses of the peace dividend -- deficit reductions, tax cuts, and increases in other government programs -- to assess the implications for long-run economic trends. Finally, it examines the transitional impacts of the drawdown.

Defense and the Economy

Annex C to
Adjusting to the Drawdown

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Defense Conversion Commission

February 1993

Prepared by: David R. Graham
An-Jen Tai
Barbara Bicksler

This paper was prepared as input to the Defense Conversion Commission in preparation of its December 1992 Report, *Adjusting to the Drawdown*. This paper does not necessarily reflect the findings, conclusions, or recommendations of the Defense Conversion Commission, the Department of Defense, or any Federal department or agency, nor does the Commission necessarily endorse the views expressed herein.

Institute for Defense Analyses
1801 North Beauregard Street
Alexandria, Virginia 22311

PREFACE

The paper was prepared by the Institute for Defense Analyses under Task Order T-B6-1106, "Defense Spending and the Economy." It addresses the Commission's requirement to assess the effects of the defense drawdown on the U.S. economy. The goal of the task was to provide the Commission with a broad understanding of how the total economy is affected by changes in defense spending, and to provide a perspective on the strengths and limitations of defense spending impact analysis.

Valuable comments in formulating this study or in reviews of earlier drafts of this paper were provided by Victor Zarnowitz, Harry Gilman, Carl Dahlman, Michael Knetter, Karen Tyson, Michael Berger, Doug Mead and Phillip Major. We thank Teresa Dillard and our editor Eileen Doherty for their help in preparing this paper.

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Summary

The Defense Conversion Commission (DCC) was established to examine the influence of the defense budget draw down on the nation's economy, and to assess the adequacy of government programs that assist conversion. In the long run, the "peace dividend" afforded by the draw down will increase consumer welfare. If invested, it could increase economic growth. In the short run, the draw down will slow the ongoing economic expansion somewhat, as resources move from defense-related activities to other uses. The purpose of this study is to estimate the long-term benefits and the near-term transitional costs of the draw down, and to show how these depend on the way the peace dividend is spent.

Our macroeconomic analysis of defense conversion complements many of the more detailed analyses undertaken by the Commission. The Commission's analyses of the impacts of the draw down on the firms and communities that have relied on DoD are essential. It is also necessary to recognize the broad, compensating adjustments in the economy that depend on how the peace dividend is spent, the growth of the economy, and their implications for employment, productivity, and consumer welfare. This study quantifies the linkages between defense and the economy by simulating major macroeconomic variables, such as gross domestic product, productivity, and employment.

We first describe the defense draw down. Under present plans, the rate of yearly spending cuts is about half the pace of the post-conflict draw downs following Korea and Vietnam. A comparison with the oil price increases in the mid and late 1970s suggests that it presents a far less significant and pervasive shock to the economy. On the other hand, by the end of the century, the cumulative peace dividend of $613 billion will be significant compared with the national debt and, if invested, could add significantly to the rate of capital accumulation.

We next examine three alternative uses of the peace dividend -- deficit reductions, tax cuts, and increases in other government programs -- to assess the implications for long-run economic trends. For each, we present the main schools of thought on the relationship between defense budget cuts and the economy. In every case, lower defense spending will make more resources available for other uses. By the year 2001, the draw down could slightly retard growth if the peace dividend is mainly consumed, or it could add up to one percent to the level of gross domestic product if invested.

Finally, we examine the transitional impacts of the draw down. In the short run, the draw down will slightly reduce employment and output growth as resources shift from defense-related work to growing industries. Defense was not, however, the prime cause of the recent recession. We find that the draw down is slowing economic growth by under 0.5 percent per year, and adding less than 0.4 percentage points to the unemployment rate. These transitional effects will dissipate by 1996. Indeed, we find that relatively few workers will lose a defense-related job compared with the number of U.S. workers who regularly seek and find work. Bureau of Census statistics show that the flow into and out of unemployment equals well over 1.5 million people per month. This monthly figure exceeds the estimated 1.4 million defense-related job separations projected over the next five years combined.

Our findings are consistent with those of other studies of the defense draw down. Those who have studied this issue generally agree that, as the U.S. economy recovers from the 1991 recession, economic growth will provide new jobs for people who lose their defense jobs. The contribution of the draw down to national unemployment should remain modest. We conclude that the draw down will not affect the overall economy to a degree that would require large-scale conversion assistance programs, directed at the national level. The Commission's review of alternative conversion assistance programs and policies should therefore focus on identifying the special cases requiring conversion assistance, and on those programs that can most effectively address state, local, or individual problems.

Defense and the Economy

INTRODUCTION

The Defense Conversion Commission (DCC) was established to examine the influence of the defense budget drawdown on the nation's economy, and to assess the adequacy of government programs that assist conversion. Concerns over these issues in both the legislative and executive branches are understandable, given the size of the proposed budget cuts. Defense outlays have fallen from a high of $340 billion (1993$) in 1987 to $278 billion in fiscal year 1993, a real reduction of about 18 percent. By 1997, the budget is planned to reach $237 billion, an additional reduction of 15 percent. This will reduce defense spending from about 6 percent of the gross national product to 3.5 percent by 1997. These cuts represent a welcomed peace dividend -- resources that were needed to deter aggression and defend the nation can now be put to other uses.

In the long run, the peace dividend could measurably alter the course of the economy, possibly improving long-run trends in investment and consumer welfare. In the short run, the drawdown is expected to create a modest drag on economic growth. The purpose of this study is to estimate the long-term benefits and the near-term transitional costs of the drawdown, and to show how these depend on the way the peace dividend is spent.

The Commission's Tasks

The DCC's assessment of the economic effects of the defense drawdown will help shape national policies on defense conversion in two important areas. The first is to consider how the planned drawdown will affect economic growth. Aside from the national security implications of reducing defense -- the adequacy of forces and the remaining defense industrial base -- it is also necessary to factor in the transition costs to the economy in deciding how to cut defense. From a long-run perspective, the temptation is to cut defense quickly, since the nation will benefit as valuable resources that are no longer needed for defense are freed up for more productive uses. But we must be prudent in managing the drawdown in order to avoid unnecessarily large transition costs. The second relates to the implications of the drawdown for national economic policies. If the Commission finds that the transitional effects of the planned drawdown are of comparable magnitude to other economic changes -- such as prior defense demobilizations, natural disasters, or other major shocks -- that have been successfully absorbed by the economy,

then no extraordinary actions may be needed. If, on the other hand, the planned drawdown risks dragging the economy into another recession, or saturating existing unemployment and safety net programs, it may be desirable to rethink the current drawdown plan, or consider additional transitional assistance policies and programs.

Why Macroanalysis?

This study quantifies the linkages between defense and the economy using simulations that project how major economic variables, such as gross domestic product, productivity, and employment, are affected by the defense drawdown. These variables depend on both direct defense spending and indirect effects working through a number of channels. A macroeconomic simulation framework is needed to capture all these effects.

Two key linkages captured in the macroeconomic simulations should be highlighted. First, spending cuts yield a corresponding "peace dividend" that can be devoted to either deficit reductions, tax cuts, or increases in other government spending. Focusing only on the cuts addresses only half the equation: A full understanding of the effects of the drawdown requires consideration of the economic benefits of the peace dividend as well as any short-run adverse effects of the defense spending cuts. Second, it is essential to consider labor market dynamics in assessing the employment effects of the defense drawdown. The net employment effects of the defense drawdown will be far smaller than the estimates of the gross separations from defense employment, because many workers will quickly find re-employment in the same or other industries as the economy grows. Economy-wide changes in employment and earnings will depend on how the peace dividend is spent, that is, if the "peace dividend" is invested to improve national productivity growth, then employment and earnings will rise relative to current trends.

The macroeconomic analysis reported in this paper complements many of the more detailed analyses undertaken by the Commission. DCC's analyses of the impacts of the drawdown on the firms and communities that have relied on DoD are essential, but it is also necessary to recognize the broad, compensating adjustments in the economy, which depend on how the peace dividend will be used, the growth of the economy in general, and their implications for employment, productivity, and consumer welfare.

Overview

The paper begins (Section B) with a description of the current drawdown, and a comparison with previous defense drawdowns and other historical shocks to the economy. We find that the current drawdown is proceeding at about half the pace of the post-conflict drawdowns following Korea and Vietnam. A comparison with the oil price increases in the mid and late 1970s suggests that the current drawdown presents a far less significant and

pervasive shock to the economy. At its planned rate, the drawdown represents a second order drag on the economy, slowing growth by under 0.5 percent per year, and adding under 0.4 percentage points to the unemployment rate. On the other hand, by the end of the century the cumulative peace dividend of $613 billion will be significant compared with the national debt and, if invested, could contribute significantly to the rate of accumulation of capital.

Section C presents simulations of the long-run implications of the defense drawdown. This section first considers how alternative uses of the peace dividend will influence long-run trends in the economy. Three alternatives are considered: deficit reductions, tax cuts, and increases in other government programs. The long-term economic projections are made using the University of Maryland's Long Range Interindustry Forecasting Tool (LIFT). We show that, by the year 2001, the drawdown could slightly retard growth if the peace dividend is mainly consumed, or it could add up to one percent to the level of gross domestic product if invested.

Section D examines the transitional impacts of the drawdown. In the short-run, the main effect on the economy will be a slight fall in employment and output as resources shift from defense-related work to growing industries. Defense cuts, along with several other factors, have contributed to the slowdown of the U.S. economy, but defense is not the prime cause of the slowdown and probably is presenting a small (but measurable) drag on the current recovery. The projections of the transitional unemployment effects are made using the University of Maryland's Quarterly Economic Structural Model (QUEST). The projections suggest that the defense drawdown will add 0.5 percentage points or less to the unemployment rate over the next couple of years, and that this transitional effect will dissipate by 1996.

Section E summarizes our findings and compares them with several recent studies that have estimated the effects of the drawdown. The general consensus is that the drawdown will have moderate effects on the economy in both the short and long run.

THE DEFENSE CUT, IN PERSPECTIVE

Before presenting the simulation results, it is useful to place the defense drawdown in perspective. Defense outlays peaked in 1987, two years after the peak in budget authority, at a level of $340 billion (FY1993$). This equalled 6 percent of gross national product (Table 1). Outlays were essentially flat for the next two years, but began falling as a share of the economy. Outlays have continued to fall every year (except between 1990 and 1991). Defense cuts through 1992 have reduced defense spending from 6 percent to 5 percent of GNP, and by 1997 defense is projected to fall to 3.5 percent of GNP.

At the present time, the nation is well into the drawdown because defense outlays have been declining for several years. Defense budget authority

peaked in 1985 and defense outlays peaked in 1987. Using 1985 as the base, total defense outlays have fallen by about 5 percent, with wide variations in the experience across the main budget accounts (Table 2). Procurement has experienced cuts of 17 percent, whereas the operations and maintenance and R&D categories have actually grown. The remaining cuts are significantly larger than the cuts that have been experienced to date in every category except procurement, where about 40 percent of the total cuts have already been made. This suggests that, by examining experience to date, we should obtain a fairly good reading on the impacts of the defense drawdown on the defense industrial base because a major share of these impacts will come through the reductions in procurement spending. In the other areas, it appears the most difficult adjustments are ahead.

One measure of the impact of the drawdown is the size of the resource reallocations that must be made each year as the defense budget is ratcheted down. The annual defense cuts range as high as 0.53 percent of GNP between 1992 and 1993, when defense outlays are projected to fall by $28 billion (1993$) in a single year. Looking to the future, we can see that additional cuts are proposed: By 1997, the U.S. will be spending $87 billion less per year on defense than was spent in FY1991, the first post-"Berlin Wall" budget year. This $87 billion per year dividend is sizable, relative to today's federal deficit. If invested by the private sector, it could increase the annual rate of gross private investment by about 7 percent by the end of the century. As we shall see in the subsequent simulations, such added investments will, over time, measurably increase the nation's stock of capital.

The cumulative peace dividend is impressive when viewed over a number of years. Over the five year period FY1993 to FY1997, the U.S. will spend $352 billion (1993$) less on defense than would have been the case if outlays were held constant at FY1991 levels. This peace dividend accumulates rapidly after 1997: Even if real defense spending remains stable after 1997, the peace dividend will equal $613 billion by the turn of the century. This cumulative dividend is large relative to both annual U.S. GNP and relative to the accumulated national debt, which today equals roughly $4 trillion.

The pace of the current defense cuts is not unprecedented in the post-World War II era: Cuts following Korea and Vietnam were more than double the pace of the current drawdown. At the height of the Korean War, defense equalled over 13 percent of GNP (see Appendix A, Table A.). Between 1954 and 1956, defense outlays were cut annually by 1, 1.15, and 0.73 percent of GNP, respectively, bringing the level of defense spending down to about 10 percent of GNP, where it hovered throughout the remainder of the 1950s. At the height of the Vietnam conflict, in 1968, defense spending again reached nearly 10 percent of GNP. Beginning in 1969, defense cuts ranging from 0.5 percent to 1 percent of GNP brought defense spending to under 6 percent of

Table 1.
Defense Cuts Relative to Gross National Product

YEAR	DEFENSE OUTLAYS ($1993)	GROSS NATIONAL PRODUCT (GNP)* ($1993)	DEFENSE SHARE OF GNP	ANNUAL CUT/GNP** (pct)	SUMMED CUT/GNP (pct)
1987	340	5650	6.0		
1988	339	5901	5.7	-.3	-.3
1989	340	6049	5.6	-.1	-.4
1990	324	6135	5.3	-.3	-.7
1991	324	6085	5.3	.0	-.7
1992	306	6148	5.0	-.3	-1.0
1993(est)	278	6247	4.5	-.5	-1.5
1994(est)	260	6372	4.1	-.4	-1.9
1995(est)	250	6499	3.8	-.3	-2.2
1996(est)	243	6629	3.7	-.1	-2.3
1997(est)	237	6762	3.5	-.2	-2.5

(est) indicates magnitudes after 1992 are estimated.
* GNP estimates assume 2 percent real growth after 1992. Defense spending is based on the President's defense budget for FY 1993.
** Equals the year to year differences from the preceding column.

Sources: Economic Report of the President, DoD Comptroller, and Isadore Greenberg, Lawrence Schwartz, Peter Kostivk, and Earl R. Wingrove, "The DoD Drawdown: Planned Spending and Employment Cuts," Logistics Management Institute Report DC 201R1, January 1993.

Table 2.
The Drawdown: Past versus Future

Budget Category	Outlay Cuts (Pct in $1993)	
	Past: 1992 vs. 1985	Future: 1997 vs. 1992
Personnel	- 6	- 24
Operations and Maintenance	+ 7	- 24
R&D	+ 5	- 14
Procurement	- 17	- 28
Total DoD	- 5	- 22

Source: Economic Report of the President, DoD Comptroller, and Isadore Greenberg, Lawrence Schwartz, Peter Kostivk, and Earl R. Wingrove, "The DoD Drawdown: Planned Spending and Employment Cuts," Logistics Management Institute Report DC 201R1, January 1993.

GNP by 1972. Defense as a share of GNP continued to fall each year until 1979. In both of these post-conflict cases, annual defense cuts reached about twice the rate planned for the current drawdown.[1]

Another way to judge the potential transitional effects of the current defense drawdown is to examine the economic shocks created by the oil price increases in the mid and late 1970s. In each case, U.S. expenditures on oil imports rose sharply, leading to a large transfer of wealth from the oil-consuming to oil-producing nations, and an immediate loss of domestic purchasing power. In 1973, the U.S. imported $7.6 billion in petroleum products and in 1974 these imports jumped to $24.3 billion, an increase of $16.7 billion. This increase equalled just over one percent of gross national product in 1975. In the late 1970s, the experience was similar. The increase

[1] Table 1 shows that the defense share of GNP fell from about 6 percent to 5 percent between 1987 (the peak) and 1992. Planned reductions will be 1.5 percent over the next five years, 1992 to 1997. Table A in Appendix A shows that in the five years after the Korean war peak, defense/GNP fell from 13.4 percent in 1953 to 10.4 percent in 1958, or 3 percent of GNP. After the Vietnam peak, defense spending fell from 9.9 percent of GNP in 1968 to 5.9 percent five years later, in 1973, or 4 percent of GNP.

in oil import costs drained off purchasing power equal to 0.6 percent of GNP between 1978 and 1979, and another 0.8 percent of GNP between 1979 and 1980. In sum, the annual purchasing power loss relative to GNP in the mid-1970s ranged from about one and one half times to well over twice the size of the proposed defense budget cuts, even during the peak year of the drawdown.

Moreover, there were several additional factors suggesting that the oil price shocks would have a more perverse effect relative to a defense drawdown — even when the short-term aggregate demand shock is comparable in size. First, the oil price shock affected the supply-side of the economy, permanently reducing the nation's wealth; a defense drawdown reallocates demands from one end use to another. Second, economists attribute part of the global slowdown in growth to the oil price increases of the 1970s, because substantial research and development and investment efforts were shifted to energy conservation. The combined wealth and technology changes generated by the oil price increases induced economy-wide changes requiring far more extensive transitional adjustments than the planned defense budget cuts. Third, panic and uncertainties combined with political mistakes surely magnified the economic impact of the oil price increases beyond the levels suggested by the relative size of the cuts.[2]

These perspectives suggest that the annual defense cuts are modest on a macroeconomic scale. They are projected to remain at about half the pace of the post-Korea and -Vietnam drawdowns, and represent a far less significant aggregate demand shock than did the oil price shocks of the 1970s. In the long run, however, the cumulative effects will be a measurable benefit to the nation. The cumulative peace dividend is sizable compared with the budget deficit and, if invested, could add significantly to the rate of accumulation of capital.

SCHOOLS OF THOUGHT ON DEFENSE AND THE ECONOMY

The linkages between defense and the economy that are the subject of our analysis have been debated throughout the Cold War era. At one level, this debate has focused on the straightforward and often-asked question: How much is enough? Defense represents a tax on society, which is used to buy a form of insurance (and deterrence) against threats of aggression. Over the

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[2] Another point of comparison is the ten percent tax surcharge imposed by President Johnson in 1968. Between 1968 and 1969, tax revenues jumped by over thirty billion, roughly twice as fast as the year-to-year increase over the preceding five years. Assuming the surcharge raised revenues by $15 billion implies that the tax syphoned off about 1.5 percent of GNP in one year. Hence the surcharge far outweighed any of the shocks discussed above, but because it was enacted in a robust economy and was temporary, it probably had little effect on the economy.

years, people with differing perspectives have debated whether the nation was over-insuring or under-insuring. With the disappearance of an immediate Soviet threat, it is generally agreed that the nation now needs less insurance. An immediate and obvious benefit of this is the peace dividend, which, as noted, will sum to over $600 billion by the turn of the century.

At a deeper level, the debate on the economic linkages between defense and the economy goes to the question of how defense affects long-term productivity and economic growth. It has been argued, on the one hand, that defense spending provides a boost to growth because it contributes to technological progress and to the skills of the work force, particularly among youths. On the other hand, it also has been argued that defense is a drag on economic growth because it syphons off talented scientists and engineers, and it syphons off investment and other resources that could be put to more productive use.

In reality, each sector considered in our analysis— defense, government and the private sector — both consumes and invests resources (Table 3). It is not accurate to say that one sector's spending is inherently better for productivity growth; it depends on the consumption vs. investment mix within each sector, and the relative rates of return available on the investments within each sector.[3] Indeed, private, government, and defense capital stocks may be highly complementary, so the optimal choice among investments would depend on the existing balance. The growth implications of defense spending cuts thus cannot be understood in the abstract, based on general principles.

This framework helps to clarify the main schools of thought in the debate on defense and economic growth. Implicit in the debate have been assumptions regarding tradeoffs between consumption and investment within sectors as well as shifts across sectors. The main reason the debate has not been settled is that the influence of defense spending depends on the precise circumstances, which often are left implicit in the analyses and the debate.[4] Several examples will serve to illustrate.

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[3] An extensive discussion of these issues can be found in Robert Eisner, *How Real is the Federal Deficit*, (New York: The Free Press, 1986).

[4] Critical reviews of the literature can be found in Steve Chan, "The Impact of Defense Spending on Economic Performance: A Survey of Evidence and Problems," *Orbis*, Volume 29, Number 2, Summer 1985, pp. 403-434 and David Gold, *The Impact of Defense Spending on Investment, Productivity, and Economic Growth*, (Washington, DC: Defense Budget Project, 1990). Other studies that conclude that the relationship between defense spending and economic growth depends on particular circumstances include: Abdur R. Chowdhury, "A Causal Analysis of Defense Spending and Economic Growth," *Journal of Conflict Resolution*, Volume 35, Number 1, March 1991, pp. 80-97. Chowdhury concludes that the relationships differ by country depending on economic conditions, socioeconomic structure, and the type of government. Studies focusing on the U.S. experience have concluded that defense spending has not been a major determinant of investment or growth. See, for example, Congressional Budget Office, *Defense Spending and the Economy*, Washington DC: 1983. CBO states that

Table 3.
Examples of Consumption and Investment Spending by Sector

Type of Spending	Sector		
	Private (p)	Government (g)	Defense (d)
Productivity Enhancing Investment (I)	Ip -- R&D -- Structures -- Equipment -- Education & Training	Ig -- R&D -- Infrastructure -- Education & Training	Id -- R&D -- Education & Training
Predominantly Current Consumption (C)	Cp -- Non durable goods -- Food -- Services	Cg -- Transfer payments -- Services	Cd -- Pay -- Operation and Maintenance of Forces -- Services

First, those who argue defense is a main driver of national productivity growth focus mainly on the investment elements of defense, which over the years have yielded spin-offs in electronics, computing, and aerospace. In some cases, these beliefs have been generalized to suggest that defense spending broadly increases productivity growth.[5] The available empirical evidence suggests, however, that only basic defense research contributes to

the economic outlook hinges more on overall budget and monetary policies than on the level of defense spending. Gold and Adams conclude that other determinants of economic growth -- U.S. fiscal and monetary policies, changes in international production, management weaknesses in the U.S. private sector, and the absence of coordinated thinking between the public and private sector -- may have a more significant effect on economic performance than does defense spending. David Gold and Gordon Adams, "Defense Spending and the American Economy," *Defence Economics*, Volume 1, 1990, pp. 275-293.

5 Evidence for this proposition has come mainly from cross-national comparisons. The classic example can be found in Emile Benoit, *Defense and Economic Growth in Developing Countries*, (Lexington, Ma.: Lexington Books, 1973).

private sector productivity growth.[6] Spending in this area is small relative to overall defense research and development, and tends to remain relatively stable over the years. Because current plans would maintain basic research, there is little reason to expect the planned defense cuts to undermine the contribution of the defense industry to private productivity growth.

Second, another main line of debate has been over whether defense mainly tends to "crowd out" investment or consumption in the rest of the economy. The weight of the available empirical studies finds that, historically, defense spending mainly crowds out consumption, and that there is no correlation between defense spending and either private investment or private research and development.[7] Despite these findings, there remains a strong conviction among many researchers that defense has reduced private investment, or has in other ways contributed to economic stagnation. A leading critic of defense spending, Lloyd Dumas, argues that military-oriented activity diverts resources from contributive sectors of the economy and leads to an erosion of productive competence, degraded infrastructure, technological obsolescence, an underskilled labor force, and a loss of competitiveness. Removing the heavy military burden will free up resources that can be put to more productive use.[8] Others that hold this view include Paul Kennedy. Kennedy asserts that the American economic decline is linked to high levels of defense spending. He, like Dumas, believes that expanding military power can weaken the prospects for economic growth because spending in the military

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6 An investigation of the productivity effects of defense research can be found in Lawrence Meyer and Fredric Raines, "Does Defense Spending Crowd Out Economic Growth?" Paper presented to the Western Economic Association International Conference, July 1992.

7 Kenneth Boulding, "The Impact of the Defense Industry on the Structure of the American Economy," in Bernard Udis (ed.), *The Economic Consequences of Reduced Military Spending*, (Lexington, Ma.: Lexington Books, 1973), pp 225-52; Michael Edelstein finds results similar to Boulding, for a more recent time period. He argues that studies that find contradictory results often fail to distinguish between the short and long run. See Michael Edelstein, "What Price Cold War? Military Spending and Private Investment in the U.S., 1946-1979," *Cambridge Journal of Economics*, Volume 14, Number 4, December 1990, pp. 421-437. Mark Wynne, "The Long-Run Effects of a Permanent Change in Defense Purchases," *Federal Reseve Bank of Dallas Economic Review*, January 1991. Wynne looks at the long-run effects of reduced defense purchases and finds that a permanent reduction in defense spending will increase consumption and leisure for the average U.S. household. Similar findings are reported in David Gold, *The Impact of Defense Spending on Investment, Productivity, and Economic Growth*, (Washington, D.C.: Defense Budget Project, 1990); Gordon Adams and David Gold, Defense Spending and the Economy: *Does the Defense Dollar Make a Difference?*, (Washington, D.C.: Defense Budget Project, 1987).

8 See Lloyd J. Dumas, *The Overburdened Economy* (Berkeley, CA: University of California Press, 1986); "National Security and Economic Delusion," *Challenge*, Volume 130, Number 2, March/April 1987; and "The Military Burden on the Economy," *Bulletin of the Atomic Scientists*, October 1986.

sector squeezes out productive capital and over time leads to slower growth.[9] Another perspective on this problem is presented by Markusen and Yudken who assert that military innovation no longer drives commercial technology advances as it once did.[10] So to improve the nation's economic condition and competitiveness -- to refurbish the nation's infrastructure and retrain its human capital -- America must reduce the amount it spends on the military. Finally, Seymour Melman maintains that sustained military spending since the second World War is the most critical factor in the cumulative depletion of the industrial economy in the United States.[11]

THE LONG-RUN SIMULATIONS

To examine the long-run effects of the drawdown on the economy, we have simulated the course of the economy over the next ten years under alternative assumptions regarding defense spending and the use of the peace dividend. Each set of assumptions will establish its own time paths for productivity, employment, and the share of the nation's output allocated to investment, consumption, and government spending. The basic question addressed by the simulations is: How will defense cuts alter these variables compared with the path that would have prevailed had defense spending not been cut?

The approach is to first establish a benchmark simulation under the assumption that DoD spending will remain constant at 1992 levels. The effects of the drawdown can then be isolated by comparing economic trends for each of the peace dividend scenarios against this benchmark. The long-term economic projections are made using the University of Maryland's Long Range Interindustry Forecasting Tool (LIFT). These simulations are not forecasts in the usual sense, because they focus only on defense cuts and therefore hold constant many of the other factors that will affect the economy, perhaps more powerfully than cuts in defense spending. Nevertheless, this approach is valuable in that it reveals the implications of the drawdown under each of the main policy options.

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9 See Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000*, (New York: Vintage Books, 1987).

10 Ann Markusen and Joel Yudken, *Dismantling the Cold War Economy*, (Basic Books, 1992).

11 Seymour Melman and Lloyd J. Dumas, "Bombs into Plowshares: Planning for Economic Conversion," *The Nation*, April 16, 1990; and Seymour Melman, "Economic Consequences of the Arms Race: The Second-Rate Economy," *American Review*, Volume 78, Number 2, May 1988, pp. 55-59.

Simulation Cases

Our simulations examine a number of alternative cases to show how trends in the economy depend on how defense is cut and how the peace dividend is spent.[12] They examine how each alternative use of the peace dividend affects the investment vs. consumption mix within each sector. The six simulation cases are presented in Table 4. In each case it is assumed that the defense cuts come primarily from activities that do not contribute significantly to private sector productivity growth. The net effect on productivity in the simulations will depend principally on the contribution from the activities funded by the peace dividend. We divide these into cases that tend to favor consumption and those that tend to favor investment. (These cases reflect relative emphasis, since the peace dividend will influence both consumption and investment to some extent in every case.)

Table 4.
Simulation Cases

Incentive Effect of the Peace Dividend	Peace Dividend Options -- Defense Cut Equals:		
	Deficit Reduction	**Tax Cut**	**Other Government Spending**
Mainly Favors Consumption	1. Deficit cut induces personal consumption	2. Personal income tax cut	3. Government consumption programs funded
Mainly Favors Investment	4. Fall in interest rate induces investment	5. Tax cut with investment incentives	6. Government investment programs funded

The first three simulations examine cases in which the peace dividend primarily induces increased consumption. The first of these reflects the "Ricardian equivalence" school of thought that believes government borrowing is tantamount to personal income taxation. The main effect of

[12] Alan C. Garner presents a similar analysis in "The Effects of U.S. Defense Cuts on the Standard of Living," *Federal Reserve Bank of Kansas City Economic Review*, Volume 76, January/February 1991, pp. 33-47.

deficit reduction in this case would be to induce households to increase consumption.[13] The second case is a personal income tax cut, which also would mainly increase personal consumption. Finally, the third case examines a transfer from defense to non-defense government consumption. There are many government programs that represent current consumption, including many governmental transfer payments, agricultural support programs, and safety-net programs. Programs such as these provide only a very indirect, second-order contribution to productivity growth. In each case, it is assumed that the peace dividend does not alter underlying productivity and labor force trends in the economy, but simply changes the composition of economic output.

The second group of simulations examines cases in which the peace dividend tends to favor investment. These cases will be discussed in some depth when the simulation results are presented below. The first of these, case four, represents the "neoclassical" economic school of thought on deficit reductions, which maintains that deficit reductions would reduce real interest rates and thereby accelerate investment and growth. Case five assumes that the peace dividend is devoted to an investment tax credit in order to directly stimulate private investment. Case six assumes the government invests directly in infrastructure, research and development, or other public capital that supports growth. In each case it is assumed that the peace dividend either increases the pace of capital accumulation or supports technology R&D that increases the productivity of labor and capital. These cases permit us to assess how investment of the peace dividend could contribute to long-run growth.

The Simulation Approach

We perform the long-run simulations using the University of Maryland's LIFT model. The model is described briefly here; the reader interested in a more detailed description can consult Appendix B. It is, in effect, both an input-output and a macroeconomic model of the U.S. economy, designed to provide long-range projections consistent with trends in production technology, shifts in industrial composition, and demographic trends. Over a period of a decade, or more, the simulation tends to evolve from the initial starting conditions toward a full employment equilibrium. Hence a comparison of simulations for each of the schools of thought on defense and

[13] The Ricardian-equivalence school of thought argues that individuals recognize the long-run tax burden implicit in government borrowing, and set aside money to cover the future obligation. In essence, increasing the deficit has the same effect as raising taxes. The implication is that deficit-financed spending does not stimulate additional consumption and growth, but merely reallocates resources from the private sector to the public sector. This view is best described by Robert Barro. See, for example, Robert J. Barro, "The Ricardian Approach to Budget Deficits," *Journal of Economic Perspectives*, Volume 3, Number 2, Spring 1989, pp. 37-54; and Robert J. Barro, "Are Government Bonds Net Wealth?," *Journal of Political Economy*, Volume 82, November 1974, pp. 1095-1117. It is supported by Paul Evans in "Is Ricardian Equivalence a Good Approximation?," *Economic Inquiry*, Volume 29, Number 4, October 1991, pp. 626-44.

the economy shows how changes in defense spending and alternative peace dividend policies shape underlying trends in the economy.

The model consists of three parts: a real side, a price-income side, and an accountant. The real side measures final demands on the economy, production by sector, and the capital and labor requirements. The price-income side takes the results from the real side to generate value added and prices. The accountant computes the macroeconomic aggregates such as GNP and unemployment from data provided from the real and the price-income side. It is here that the impacts of government tax and monetary policy are measured to determine disposable income, income distribution, savings, average wages, and interest rates. In turn, these and other variables become inputs to the real side and the price-income side. The process iterates between the three portions of the model until a convergence criterion is met.

SCENARIO ASSUMPTIONS

A set of exogenous assumptions must be specified for each scenario to be simulated. Unless otherwise specified, we have used the University of Maryland's recent assumptions in our simulations (from the 5/92 version of LIFT). These include:

- Growth rate of the money supply,
- Federal non-defense expenditures,
- Federal tax rates,
- State and local expenditures,
- State and local tax rates,
- Exchange rates.

In the base case, defense is held level at 1992 levels, and projections are made using the basic LIFT assumptions. Each of the alternative cases assumes cuts in defense as specified in the FY1993 President's budget submission.[14] Special assumptions were then applied to capture the alternative uses of the peace dividend in each of the six simulation cases described in Table 4, as follows:.

[14] For defense expenditures, we used the mid year (1992) budget forecast from the Council of Economic Advisors' for the years 1992 through 1997, holding real expenditures constant from 1998 through 2005. The cuts in defense spending allocated to employee compensation equal the projected personnel cuts multiplied by a constant real cost per employee. After subtracting these cuts from the total budget cut, the remainder was allocated to reductions in defense purchases from the private sector.

Case 1: Debt reduction -- Consumption: The "Ricardian equivalence" case is introduced by cutting the personal savings rate sufficiently so that savings will fall by about the same amount as the deficit reduction from the defense spending cuts. Consistent with the equivalence theory, this increases consumption by roughly the same amount as the defense cut.

Case 2: Personal tax cut: Federal income tax rates are reduced sufficiently to reduce the tax take by about the same amount as the defense cut. This maintains budget deficits roughly constant.

Case 3: Increase in government consumption: Defense spending cuts are applied to other government spending. These funds are spread across employee compensation and purchases.

Case 4: Debt reduction — Investment: In this "neoclassical" case, debt reduction mainly induces increased investment. Exchange rates are adjusted to reflect the impact of declining interest rates due to reduction of government borrowing.[15].

Case 5: Investment tax cut: An investment tax credit is instituted equal to the peace dividend. This maintains budget deficits roughly equal to the base case.

Case 6: Increase in government investment: The peace dividend is allocated to federal infrastructure investments in roads, bridges, sewer systems, etc.

In addition to these modeling assumptions, we also have introduced productivity increases to reflect the added investment induced in cases 4, 5, and 6. This is a critical variable in shaping the linkage between defense and the economy, and hence deserves careful discussion. The following subsection outlines how productivity is modeled in LIFT and how our assumptions were introduced.

MODELING PRODUCTIVITY

In the LIFT model, labor productivity is estimated at an industry level. The equations are quite simple. For each industry, the equation includes a time trend, which presumably captures technological change, and a variable that simulates the changes in labor productivity over the business cycle. Changes in the capital stock or human capital do not affect productivity in LIFT. In our simulations, we therefore have introduced a linkage between investment and productivity by introducing assumptions about the social rate

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[15] Exchange rates are exogenously specified in LIFT.

of return on such investments and changing the growth rates of productivity accordingly.[16]

Our assumptions regarding the contribution of private and government investment to productivity growth are based on a review of the literature on the determinants of economic growth. At one level, the answer is straightforward: GNP is by definition equal to labor productivity multiplied by the level of employment, so the percentage change in GNP is approximately equal to the sum of the percentage changes in labor productivity and in employment. Assuming that fiscal policy has little or no effect on demographic trends and labor force participation rates, the factor that drives long-run GNP growth in LIFT is labor productivity.

Three main variables shape labor productivity growth: 1) changes in the capital stock, 2) changes in human capital (levels of education and training), and 3) changes in technology. The estimates of the relative contribution of these components have varied considerably, and remain controversial. The pioneering work by Solow and Denison suggested that less than half the changes in productivity growth could be explained by the growth of labor and capital. More recent cross-country analyses on productivity (e.g. DeLong and Summers) suggest that the earlier studies may have underestimated the effect of capital by aggregating equipment investment with structures investment. They find large rates of return, on the order of 30 percent.[17] As we discuss subsequently, recent studies of government investment also have found social rates of return on the order of 30 percent or more, but others have begun to question these findings.

We choose to make assumptions that are relatively conservative in order to reflect long-run historical patterns of average rates of return, rather than the larger estimates available in these recent studies. One reason is that the magnitude of the investment induced by the peace dividend is quite large, so it is implausible to imagine achieving 20 to 30 percent rates of return on the

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16 There is a variable (EMPTIME) in LIFT that changes the speed of productivity adjustments. (One could interpret this as applying a factor to the time trend coefficient in all of the labor productivity equations.) Using this fix allows us to change the levels of aggregate productivity while maintaining the relative differences in productivity across the sectors.

17 See J. Bradford De Long and Lawrence H. Summers, "Equipment Investment and Economic Growth," *The Quarterly Journal of Economics*, May 1991, pp. 445-502. Other studies focus on the importance of human capital in productivity growth. Robert Barro shows how the growth rate in GDP is positively related to high levels of human capital in "Economic Growth in a Cross Section of Countries," *The Quarterly Journal of Economics*, Volume 106, Number 2, May 1991, pp. 407-443. Paul Romer emphasizes the importance of technology as a factor in growth and its relationship to human capital. Human capital is a key input to the research sector which generates the new products or ideas that underlie technological progress. He also down plays the importance of physical capital and technological change, suggesting that an increase in investment has no long-run effect on the *growth rate* of technology or output. See "Capital, Labor and Productivity," *Brookings Papers on Economic Activity: Microeconomics 1990*, Brookings Institution, 1990.

average. For cases 4 and 5, we have assumed a real social rate of return to private investment of 10 percent. For case 6, we have assumed a rate of return of 5 percent for public investment. (Some sensitivity analyses examining higher rates of return are also reported.)

Simulation Results

Three kinds of variables are used to summarize the simulation results for each of the six cases: First, are productivity and income growth variables; second is the mix of goods produced in the economy — the guns vs. butter tradeoff. Even if defense cuts do not improve growth, consumers will nevertheless benefit from a larger share of the GNP pie. A final measure is employment. As the composition of national output changes, so too will the pattern of employment. The composition of employment also provides an indicator of the size of the transition entailed under the different peace dividend options.

PRODUCTIVITY AND GROWTH

The cases wherein the peace dividend is consumed (cases 1, 2,and 3) have virtually the same output trends as the base case (Figure 1); this reflects the fact that long-term productivity trends are changed only slightly by the allocation of defense to other government or private consumption (Table 5). Productivity growth rates for each of the three peace dividend consumption cases is very slightly below the base case. Consequently, output in every case is about 0.3 percent below the base case in 2001. (There is, of course, a change in the composition of output, which is discussed in Part b.)

When the peace dividend is invested, long-run productivity and growth increase. For example, the rate of growth for the case where tax cuts are invested is 5.1 percent greater than the base case (this is case 5 in Table 5).[18] In terms of average annual growth rates, this difference is significant and would yield large cumulative gains in output over time. By the year 2001, such investment increases GDP by over 1 percent. This would be equivalent to an addition of over $60 billion to GDP in 1993 terms -- hardly small change. Of the three investment cases, the investment tax credit has the greatest influence on productivity because it is the most highly leveraged in favor of investment. We shall discuss each of these investment cases in turn.

[18] This is calculated from Table 5 as follows: 5.1% = 100*(1-2.49/2.37).

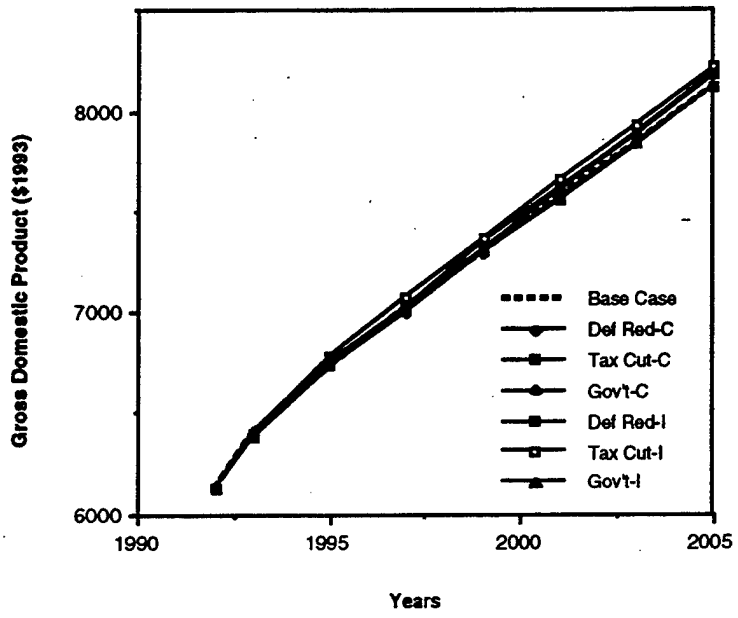

Figure 1.
Trends in Gross Domestic Product

Table 5.
Productivity and GDP Growth (1992 - 2001)

CASE	2001 GDP RELATIVE TO BASE (BASE = 100)	GDP GROWTH (%/YR)	PRODUCTIVITY GROWTH (%/YR)
Base Case	--	2.37	0.88
1. Def Red-C	99.8	2.35	0.86
2. Tax Cut-C	99.8	2.35	0.86
3. Gov't-C	99.9	2.36	0.85
4. Def Red-I	100.7	2.45	0.94
5. Tax Cut-I	101.1	2.49	1.01
6. Gov't-I	100.4	2.41	0.92

Deficit Reduction: Most economists believe that deficit spending encourages consumption, raises real interest rates and "crowds out" investment, producing a high-consumption, slow-growth economy.[19] Reductions in the deficit would ease the demands on the capital market, reduce the real rate of interest, and thereby mitigate the crowding out of investment. Cutting defense and the deficit would thereby move the economy to a lower-consumption, higher-growth equilibrium. However, the full amount of the deficit reduction would not be channeled into investment, since some would be channeled also into increased consumption. Moreover, the effects of cutting the deficit would be muted because international capital flows have served to buffer the effects of government borrowing.[20] Correspondingly, a cut in the deficit will likely reduce foreign as well as domestic lending, so the increase in U.S. purchasing power will not equal the cut. Consequently, the deficit reduction is likely to increase investment less than would the peace dividend options targeted more directly at investment.

Tax cut: The fifth simulation case involves a tax cut that transfers resources from defense consumption to private investment. This could occur through cuts in capital gains taxation, or tax credits for research and development or investment. Each has been proposed as a means to stimulate investment, and has been shown to provide at least some stimulus. There is considerable debate regarding the most effective forms of tax incentives for investment and the extent to which such incentives can actually increase productivity growth. Nevertheless, there is general agreement that increased

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19 In the neoclassical view, this happens because the borrowing increases consumers' perceived wealth: they recognize the increase in wealth created by government spending and the increase in bonds, but they do not take into account the eventual need for the government to raise taxes to repay the loans. If there are underutilized resources in the economy, this stimulus will increase the level of output. This neoclassical view is described by Douglas B. Bernheim in "A Neoclassical Perspective on Budget Deficits," *Journal of Economic Perspectives*, Volume 3, Number 2, Spring 1989, pp. 55-72 and Edward M. Gramlich, "Budget Deficits and National Saving: Are Politicians Exogenous?" *Journal of Economic Perspectives*, Volume 3, Number 2, Spring 1989, pp. 23-35. Two working papers by the Congressional Budget Office, *Deficits and Interest Rates: Theoretical Issues and Empirical Evidence* (Washington, DC: 1989) and *Deficits and Interest Rates: Theoretical Issues and Simulation Results* (Washington, DC: 1989) generally support the neoclassical view, but summarize the range of theoretical perspectives concerning the relationship between the federal deficit and interest rates.

20 Feldstein has argued that the twin deficits -- federal budget and trade deficit -- go hand in glove. The federal budget deficit has in part been financed by foreign lenders, notably the Japanese. Net overseas borrowing means, by definition, that the U.S must incur an offsetting current account deficit. This condition may persist as long as such lending continues. The implication is that a significant fraction of the deficit spending in the U.S. has stimulated demand in other economies. Hence the deficit has done both less harm and less good to the U.S. economy than a closed model would suggest. Conversely, a cut in the deficit will cut foreign lending as well as U.S. lending, so the increase in domestic purchasing power will not equal the cut in the deficit.

investment will increase productivity growth.[21] Because of the leverage involved in offering tax incentives for investment, the potentially high rates of return on investments such as research and development, and the expectation that private investors will choose productive projects, this case has the highest projected growth rates of the cases examined.

Other government: Government investment programs encompass a broad range of activities including basic research, infrastructure investments, technology diffusion programs (such as agricultural extension programs), and education. The productivity of such investments has been the subject of a fair degree of study and debate in recent years. There is long-standing agreement among economists that basic research yields a high rate of return, and that government sponsorship is appropriate because the social returns far exceed the private returns. One analysis finds that basic research funded by the defense, government, and private sectors contributes to productivity growth.[22]

There are several analyses that would suggest there are potentially high marginal rates of return on technology diffusion, but realizing the potential depends greatly on the diffusion mechanism used. The agricultural extension service seems to have contributed substantially to U.S agricultural productivity growth. Recent analyses of infrastructure investments have sparked a lively debate. Aschauer prompted the debate with the publication of time series correlations of government investment against productivity growth that suggests marginal rates of return on government infrastructure investments of 40 percent or more.[23] Several follow-up studies have discounted these findings, and a recent CBO review of the issue concludes that government infrastructure investment yields are probably roughly equal to private sector returns.[24]

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21 Michael J. Boskin examines changes in the tax code in the 1980s that emphasize consumption versus investment tax in "Tax Policy and Economic Growth: Lessons from the 1980s," *Journal of Economic Perspectives*, Volume 2, Number 4, Fall 1988, pp. 71-97. Robert Hall and Dale Jorgenson conclude that tax policy can be highly effective in stimulating investment. Their conclusions are based on an examination of tax policy shifts in the 1950s and 1960s. See Robert Hall and Dale Jorgenson, "Tax Policy and Investment Behavior," *American Economic Review*, Volume 56, June 1967, pp. 391-414.

22 See Laurence H. Meyer and Fredric Q. Raines, "Does Defense Spending Crowd Out Economic Growth?," *Western Economic Association International Conference*, July 1992. Meyer and Raines also conclude that applied defense R&D and applied federal non-defense R&D have little impact on productivity growth in the private sector.

23 See David A. Aschauer, "Is Public Expenditure Productive?," *Journal of Monetary Economics*, Volume 23, 1989, pp. 177-200. Aschauer argues further that the relationship between public capital and productivity may well be important in explaining the slowdown in productivity that has occurred since the early 1970s. He shows a correlation between slowing productivity and a decline in the net public capital stock.

24 While CBO agrees that federal infrastructure investments are important to private economic output, they are critical of the high rates of return suggested by Aschauer. Only in

Our simulations assume that government investment will in practice be slightly less productive than private investment. Consequently, the impact on national productivity is roughly comparable to the deficit reduction case, and significantly less than the effect of the investment tax credit.

COMPOSITION OF GROSS DOMESTIC PRODUCT

The reductions in defense could potentially bring about measurable shifts in the share of Gross Domestic Product going to investment, consumption, or government spending. Table 6 shows the relative size of the main components of GNP for the main simulation cases. The defense cuts reduce the projected share of defense from the base case level of 4.7 percent of GDP in 2001 to about 3.6 percent for each of the simulation alternatives. Other government spending is about 14.5 percent of GDP for either the government

Table 6.
Composition of Gross Domestic Product in 2001 (Percent)

SIMULATION CASE	CONSUMP-TION	INVEST-MENT	NET EXPORTS	GOV'T SPENDING (LESS DEFENSE)	DE-FENSE	GROSS DOMESTIC PRODUCT
Base Case	62.8	19.5	-0.4	13.4	4.7	100.0
1. Df Red-C	63.7	19.6	-0.4	13.5	3.6	100.0
2. Tx Cut-C	63.7	19.6	-0.4	13.5	3.6	100.0
3. Gov't-C	63.0	19.4	-0.5	14.5	3.6	100.0
4. Df Red-I	62.5	20.2	-0.4	13.4	3.6	100.0
5. Tax Cut-I	63.1	20.6	-0.7	13.3	3.6	100.0
6. Gov't-I	62.8	19.6	-0.5	14.4	3.6	100.0

carefully chosen cases might those rates of return be realized. See Congressional Budget Office, *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy*, Washington, DC: July 1991. J. A. Tatom opposes Aschauer's assertion that the decline in public capital contributed to the productivity slump in the 1970s. Instead he asserts that the decline in public capital formation can be explained by economic influences, such as population shifts and changes in the price of energy.

investment or government consumption cases, and 13.5 percent or less in the other cases -- a difference of at least one percentage point. Consumption varies as much as 1.2 percentage points between cases. It is 63.7 percent for consumption-oriented tax cut, and 62.5 percent for the investment-oriented tax cut. Finally, investment ranges from 20.6 percent of GDP when the investment tax credit is assumed to 19.4 percent in the government consumption case.

EMPLOYMENT EFFECTS

As noted earlier, the economy converges toward full employment in the long run simulations, so there is very little difference between the total employment levels among the simulation cases.[25] There are shifts, however, in employment across broad sectors of the economy, indicating its changing composition. Two sectors that experience the most significant changes are manufacturing and trade (Table 7).

Table 7.
Employment in 2001 (millions)

Simulation Case	Total	Manufac-turing	Trade	Government
Base Case	142.1	19.8	32.4	23.0
1. Def Red -- C	142.4	19.6	32.8	22.7
2. Tax Cut -- C	142.4	19.7	32.8	22.7
3. Other Gov't. -- C	142.6	19.6	32.4	23.4
4. Def Red -- I	142.3	20.1	32.5	22.7
5. Tax Cut -- I	142.2	19.8	32.7	22.7
6. Other Gov't -- I	142.3	19.7	32.4	22.7

[25] In the LIFT model, employment growth is slightly inversely related to productivity growth. This reflects two facts: work force growth is fixed in the model, and the economy adjusts very slowly to the full employment equilibrium. It also reflects an incomplete modeling of foreign trade. The model does not capture the expansion of exports that should result from the increases in productivity in the investment cases. Hence, total employment is probably understated for those cases.

Manufacturing employment depends on whether the peace dividend is spent on consumption or invested. In the former case, employment falls slightly, roughly 200,000 employees by 2001. But when the peace dividend is invested, manufacturing employment rises. With the investment tax credit, 330,000 net additions to the manufacturing work force are projected. Trade employment tends to move in the opposite direction as manufacturing employment. Trade jobs increase between 700,000 and 1.1 million when the peace dividend is consumed, but fall slightly when the peace dividend is invested.

Summary

Looking across the alternative uses of the peace dividend, the simulations show that the defense cuts could slightly retard economic growth if the peace dividend is mainly directed toward consumption, and it could moderately increase economic growth if the peace dividend is effectively invested. Because the defense spending cuts are relatively small compared to the overall U.S economy, we should not expect them to provide dramatic improvement in the performance of the economy. Indeed, in no case is the effect large, and arguably any effect estimated in these simulations could be offset or dominated by other factors that influence the economy.

Nevertheless, the benefits of the dividend should not be belittled. The simulations show that investing the peace dividend could increase productivity growth by up to 0.2 percentage points per year, which by the year 2001 could increase the level of GNP by about one percent. (That would be equal to about $60 billion in 1993 terms.) And of course, the cumulative benefits of such investments will grow — over several decades a 0.2 percent improvement in the trend rate of growth can make a significant difference. Finally, although the net employment changes are fairly small in any case, the choice between consumption and investment of the peace dividend will help determine whether U.S. manufacturing employment will grow or decline.

TRANSITIONAL EMPLOYMENT

In the long run, the nation will benefit measurably from the peace dividend. During the transition, however, there will be costs, largely due to temporary unemployment. Workers that leave defense-related employment will enter the unemployment pool and subsequently will be rehired. One indicator of the transition costs to the individual is the duration of unemployment, which presently is around 7 weeks for the median worker

entering unemployment.[26] The purpose of this section is to provide estimates of the transitory unemployment caused by the current defense drawdown under the alternative peace dividend policies.

Transitory unemployment occurs because the growth in demand perceived by households and firms that will ultimately benefit from the peace dividend may lag behind the cuts in defense. If this mis-phasing of demands is significant at the national level, it could conceivably lengthen the time required by displaced workers to find new employment, thus temporarily increasing unemployment. The main factors influencing these labor market dynamics include (i) the rate of the defense employment separations relative to the labor market, (ii) ongoing employment growth in the economy as a whole, and (iii) the government's use of the peace dividend. This section examines each of these factors in turn, and concludes with our estimates of the likely contribution of the drawdown to unemployment.

Job Job Separations and Labor Markets

The long-run simulations presented in the preceding section indicate that the defense drawdown could induce long-term net losses of up to about 200,000 manufacturing jobs and up to 500,000 government jobs.[27] Nevertheless, by 2001 total U.S. employment is forecast to increase by about 18 million. That is a net employment gain of 2 million workers per year over the next 9 years. In fact, many of the major defense-related industries will continue to grow throughout the drawdown, because increases in civilian

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[26] The annual average duration of unemployment for representative periods is as follows:

Year	Mean (wks)	Median (wks)
1988	13.5	5.9
1989	11.9	4.8
1990	12.1	5.4
1991	13.8	6.9

Source: Employment and Earnings (U.S. Department of Labor), Jan. 1991-92, Table 14.

[27] The Defense Economic Impact Modeling System (DEIMS) projects a gross employment loss of 958 thousand private sector jobs between 1991 and 1997, and the government projects the loss of 335 thousand civilian and military jobs between 1992 and 1997. Hence, the gross separations caused by the drawdown equal nearly 1.4 million. Much of this drawdown will occur over the next three years, so to provide conservative estimates we assume that all job separations occur in three years. Over these three years, the drawdown causes 460 thousand separations per year.

demand are forecast to more than offset the reductions in defense.[28] The civilian aerospace industry is expected to grow substantially. Combined defense and civilian demands for electronics and communications apparatus will also lead to growth in electronics sectors. We can be confident, therefore, that, in time, growing firms will more than offset the employment separations caused by the defense cuts.

But the near-term concern is with unemployment during the transition. Fortunately, even here we can expect the problems to be relatively moderate on a national scale, because at any point in time, DoD-related separations represent a relatively small fraction of those seeking and finding jobs. Bureau of Census statistics show that there is a tremendous ongoing flow of people into and out of the unemployment pool. These data suggest that the flow into and out of unemployment equals well over 1.5 million people per month.[29] This exceeds the 1.4 million defense-related job separations projected over the next five years combined.

The implication of these numbers is that the direct effect of the defense drawdown on national unemployment rates will be relatively moderate. On average, over the next three years we estimate that the direct effects of the defense drawdown will account for at most about 467,000 separations per year.[30] If these defense workers were to remain unemployed for six months — more than four times the current median spell — then these separations would account for just under 0.2 percentage points of the current 7.5 percent unemployment rate.

Consideration of local or regional labor market conditions suggests, however, that concentrated defense separations could lead to high local unemployment rates, which in turn could cause the contribution of defense-related separations to the national unemployment rate to exceed the levels noted above. First, those who work in specialized niche markets for DoD may face a much tougher situation than our aggregate statistics suggest; this can be

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[28] David Henry, "Industrial Output Effects of Planned Defense Spending Cuts, 1990-1994." Bureau of Economic Analysis Staff Paper, U.S. Department of Commerce, February 1991. Henry found that 13 of the top 28 sectors (ranked in terms of percent of sales to defense) will experience growth of total output between 1990 and 1994, despite planned cutbacks.

[29] Data for 1986 provide a representative example for a relatively prosperous year when the average rate of unemployment was about 6 percent. There were 128 million people who either worked or looked for work in 1986. Of these, there were 20.7 million who experienced some unemployment -- about 16 percent of the labor force. About 5.7 million -- one in four -- experienced unemployment that exceeded six months, the rest found work in less time.

[30] Defense separations will average 467 thousand per year. In 1992, average unemployment was 9.5 million, or 7.5 percent. If defense workers remained unemployed for six months -- a conservative assumption -- they would account for 0.5*0.467/9.5 = 5 percent of all the unemployed. Thus they would have accounted for 0.1875 percentage points of the unemployment rate.

compounded when defense production is geographically concentrated. For example, it has been estimated that 20 percent of aerospace workers in Southern California have been laid off over the last five years.[31] If these workers continue looking for work in the Southern California aerospace market, the result could be longer periods of unemployment than were assumed in the preceding calculations. Second, towns that depend heavily on a defense contractor could experience spill-over job losses when defense-related employment is cut if (i) there is no offsetting growth in demand, and (ii) the cuts are large enough on a local scale to induce second-round separations in firms that supply and serve defense workers' households.

Since the defense cuts are concentrated geographically, it is important to consider local and regional labor market effects in assessing national unemployment effects. Bureau of Labor Statistics data on employment through the third quarter of 1992 allow us to focus on this issue by examining the recent employment trends in the twelve states with the largest shares of defense employment; these states are the most susceptible to the short-run impacts of the drawdown.

First, 1990 employment is compared with 1987 levels — the peak year for defense outlays (Table 8). Despite the defense cutbacks, only Massachusetts experienced a decline in statewide employment, suggesting that economic growth created enough new jobs to offset the defense losses in the remaining states, and thus kept statewide employment from falling. Indeed, employment in seven of the twelve states grew as fast or faster than total U.S. employment, which increased by 4.9 percent. Of the five states with the highest proportion of defense employment, employment in Massachusetts and Connecticut grew slower the rest of the nation, while employment growth in Virginia, California, and Maryland equaled or exceeded the national rate. This clearly demonstrates the over-riding importance of state-wide economic conditions in determining state employment trends, even in those states with a high concentration of defense business.

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31 Employment data at the level of individual communities suggests that the local impacts of defense spending can be more severe than state averages suggest. For example, Los Angeles County has experienced far sharper declines than California as a whole. Between 1987 and 1992, aerospace employment fell 20 percent in Los Angeles and 7.5 percent in the rest of California. During the same period, non-aerospace manufacturing employment dropped 7.4 percent in Los Angeles, but grew 4.4 percent outside of Los Angeles. California's employment problems thus are largely centered in the Los Angeles area. See James Dertouzos and Michael Dardia, "Defense Spending, Aerospace, and the California Economy," (Santa Monica, Ca.: The Rand Corporation, 1993), p. 23.

Table 8. Employment Growth

AREA	DOD EMPLOYMENT SHARE (pct in 1991)	EMPLOYMENT GROWTH RATIO*	
		1990/1987 (1987=100)	1992/1990 (1990=100)
NATIONAL	3.6	104.9	99.7
STATES (Ranked by DoD Employment Share)			
Connecticut	8.3	100.2	97.5
Virginia	7.4	106.6	102.8
Massachusetts	6.5	99.7	96.1
California	5.6	106.9	99.7
Maryland	5.5	105.0	101.4
Mississippi	5.2	105.9	99.2
Missouri	4.9	102.4	102.4
Arizona	4.8	108.1	98.2
Washington	4.5	114.1	100.9
New Hampshire	4.4	103.8	98.5
Maine	3.9	107.5	102.0
Vermont	3.6	103.2	102.0

* Shading indicates states where employment growth is below the national average.

The second comparison is made for the national recession and slow growth period of the early 1990s. National employment declined by 0.3 percent, reflecting the employment effects of the 1990-91 recession and the slow recovery. Despite this, six of the twelve states sustained some degree of employment growth, and seven equaled or exceeded the national average. Of the twelve states, only three — Connecticut, Massachusetts, and New Hampshire — experienced employment growth below the national trends in both of the periods. The extent to which these states' problems are defense induced deserves further investigation; but the main point is that, in many of the states most dependent on defense, employment separations are occurring in a job market where total employment continues to grow as fast or faster than the nation as a whole.

These results show that even when taking state employment considerations into account, the direct contribution to national unemployment of separations caused by the defense drawdown should still be relatively modest.[32] Only three of the "defense impacted" states have had employment growth below the national rate throughout the period. These data are not meant to belittle the personal costs of job loss; they are meant only to suggest that the defense-related separations are not, in themselves, creating large drops in employment that might overwhelm national labor markets. The appropriate focus of future analysis therefore should be on states and communities.

Defense Cuts and Near-Term Economic Growth

A second and related question is the extent to which the defense cuts themselves have contributed to the national slowdown in employment growth. The transitional relationship between defense cuts and overall economic activity can be illustrated by plotting changes in defense outlays and changes in GNP over the post-World War II era (Figure 2).

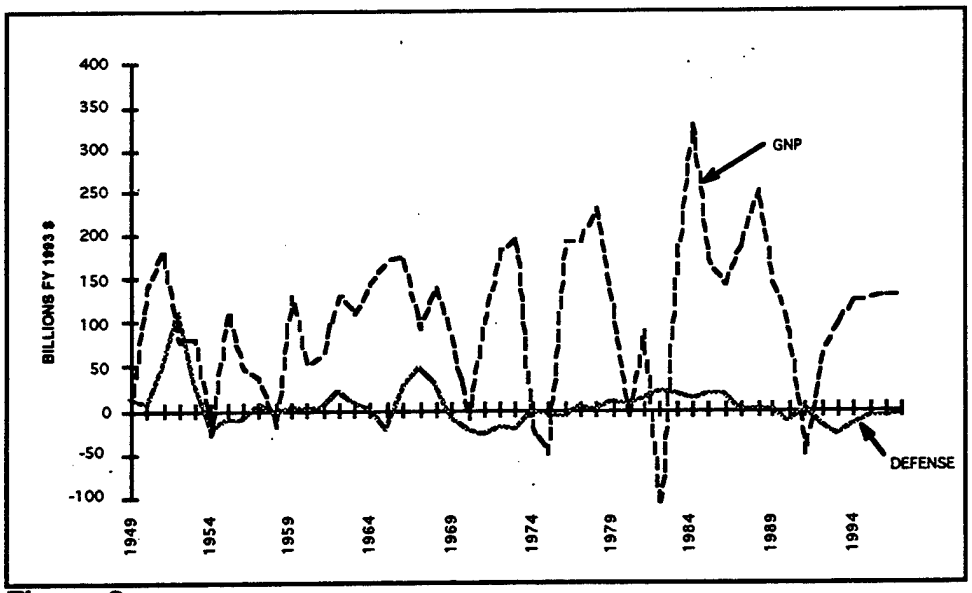

Figure 2
Yearly Changes in Defense Outlays and GNP ($1993)

32 Two other studies that focus on the transitional employment effects of defense cuts come to similar conclusions. See Linda Levine, *Defense Spending Cuts and Employment Adjustments*, Washington, DC: Congressional Research Service, June 27, 1990; and Lori L. Taylor, "Reduced Defense Purchasing: Anticipating the Impact on State and Industry Employment," *Federal Reserve Bank of Dallas Economic Review*, November 1990.

Two main points are supported by this comparison. First, year-to-year changes in GNP are far larger and more variable than are variations in defense, and sometimes move in opposite directions. Swings in GNP range from +200 billion or more in growth years to -50 billion or below in recession years — swings that swamp year to year changes in defense. Moreover, a number of the cycles observed in the GNP, such as those observed in 1980 and in 1980-81, actually run counter to the direction of change in the defense budget. Hence, changes in defense cannot be considered dominant factors in determining changes in the national economy.

The steep drawdowns following Korea and Vietnam may, however, be exceptions to this general rule. The very sharp cuts in defense in the 1950s and 1960s may have contributed to the coincident economic recessions.[33] Indeed, in the mid 1950s there was close to a dollar-for-dollar drop in both defense and GNP. Similarly, the sharp defense cuts in the late 1960s may well have contributed to the brief recession of 1970, although there were a number of other factors that were probably more important. These findings raise the possibility that steep defense cuts — on the order of one percent of GNP per year — can measurably affect the overall economy, and could perhaps trigger a recession.

In the case of the current drawdown, it appears the pace has remained below the threshold that could trigger an economy-wide slump. Defense cuts had begun prior to the 1990-91 recession, but they were small and not highly correlated with the recession. Between 1989 and 1990, defense outlays fell $16 billion and economic growth fell from $148 billion per year in 1989 to $86 billion in 1990, a drop of $62 billion (see Appendix A, Table A). The defense cut thus "accounted" for about 25 percent of the decline in the rate of output growth. But, between 1990 and 1991, defense held steady (Desert Storm expenditures accounted for this), and GNP growth fell into a recession, from +$86 billion per year to -$50 billion, a swing of $136 billion. Clearly defense was not the proximate cause of this 1990-91 recession, since it did not directly account for any of this decline. Since then, the economy has begun a slow recovery despite the continuation of defense cuts.[34]

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[33] This hypothesis finds support in Victor Zarnowitz, Business Cycles: Theory, History, Indicators, and Forecasting, (Chicago: University of Chicago Press, 1992). He concludes, "The cessation of Korean hostilities in 1953 was followed by an unnecessarily abrupt and sharp cutback in defense spending that aggravated the 1953-54 recession" (p. 113). Similarly, the fiscal contraction between mid-1968 and mid-1973 "may have contributed to the recession of 1970..., although it did not appear to retard the expansion of 1971-73" (p. 114).

[34] It is reasonable to assume that the pace of the current recovery will be slowed by the continued drag of the defense cuts, which will be in the range of 0.25 to 0.5 percent of GNP over the next three years. In 1993 the economy is projected to expand by roughly $100 billion, or about 1.6 percent, even though defense will decline by $28 billion. The degree to which this $28 billion subtracts from growth cannot be estimated with any accuracy. But suppose that GNP is temporarily reduced by $1 for every $1 of defense cut, because the demands associated with the peace dividend lag behind the defense cuts. GNP growth would

These data support the hypothesis that defense cuts were not the proximate cause of the 1990-91 recession, and that other factors in the economy (discussed below) were probably the main reasons for the recession. An alternative hypothesis is that the expectation of future defense cuts may have had an "announcement effect," prompting firms and households to adjust in anticipation of future cuts. The drawdown thus may have contributed more to the fall in the economy than is suggested by the direct impact of the rather small actual cuts. Regardless of whether one believes that defense cuts did or did not contribute substantially to the 1990-91 recession, the recovery now under way suggests that the major macroeconomic effect of the drawdown may now be behind us.

It is useful to consider the other factors that may have contributed to the 1990-91 recession, because their effects on aggregate demand dwarf the effects of the defense drawdown. In the late 1980s, the financial troubles of the S&Ls and commercial banks, combined with tight monetary policy, led to tight money and tight credit.[35] Consumer pessimism rose to historic levels, reflected in part by a significant trend among households to improve their balance sheets by reducing consumer debt, leading to very flat trends in household spending. Perhaps most dramatic was the decline in U.S. investment in the second half of the 1980s. Responding to the removal of investment incentives in the 1986 tax law, and gradually tightening credit conditions, the annual rate of total gross private domestic investment fell by $116 billion over the two year period, 1989 to 1991. The commercial and residential construction industries led the decline in the second half of the 1980s. Between 1989 and 1991, investments in nonresidential structures fell by $23 billion (1987$) from $177 billion to $154 billion. Investments in residential structures fell by $39 billion over the same two-year period. Combined, these cuts equalled $62 billion — about four times the size of the defense cuts over the same period.

Defense cuts no doubt have contributed to the economic slowdown, but it appears they have had a far smaller effect than have other economic factors. We noted earlier that the pace of the drawdown will accelerate, but it will still remain well below the 1 percent per year cuts during the post-Korea and Vietnam drawdowns. At the pace currently planned, the short-run effects of the drawdown should have no more than a second order effect, creating a small but measurable drag on the current economic recovery. A significantly faster drawdown, however, could have a disproportionately greater adverse short-run effect on the economy.

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be $128 if defense were not cut or there were no lag in the effectiveness of the peace dividend, a growth rate of about 2 percent.

35 The budgetary cost of the S&L crisis itself was $10 billion in 1988, $22 billion in 1989, $58 billion in 1991, and $62 billion in 1992. CBO, *Economic and Budget Outlook*, (Washington, D.C.: Congressional Budget Office, Jan. 1992).

Simulation Results

We can turn now to the third issue: How will alternative peace dividend options influence the transition? To examine this issue, we have simulated the near-term trends in the economy under each of the peace dividend options. Whereas the long-run simulations focused on measuring the effects of the defense drawdown ten years into the future, these simulations focus on the transitional effects of the drawdown over the next four years. The analysis focuses on two main variables, gross domestic product and unemployment. Trends in these variables capture the main short-run differences among the peace dividend options.

SIMULATION APPROACH

We estimate the transitional labor market effects of the defense drawdown using the University of Maryland's Quarterly Economic Simulation Tool (QUEST). Four cases are examined: A base case with no defense cuts, and one case for each of the alternative peace dividend options: deficit reductions, tax cuts, and shifts to other government spending (these correspond to cases one, two, and three in the long-run simulations). Appendix C briefly describes the QUEST model and the main assumptions employed in our simulations. In general, we employed the same approach with exogenous assumptions as we did with LIFT.[36]

SIMULATION FINDINGS

The findings for GDP support two main conclusions (Figure 3). First, the only significant difference among the cases is that in the deficit reduction case growth is about 0.4 percentage points below the base case and each of the two other peace dividend alternatives. This happens because the QUEST model's lags in capital market adjustments cause the new demands stimulated by deficit reduction to lag behind the defense cuts. In contrast, the tax cut, or transfer to other government spending, quickly creates new demands that offset the defense cuts. Thus these cases yield essentially the same time path for output as does the base case.

The second conclusion is that this difference among the cases is eliminated by 1996. (Indeed, in 1997 GDP for the deficit reduction case crosses and subsequently exceeds the other cases.) In short, the deficit reduction case will slow the economic recovery more that the other two peace dividend options, but beyond about 1997 these transitional effects will be largely eliminated and productivity growth will begin to dominate the trends.

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[36] One important exception is the exchange rate, which is endogenously determined in QUEST.

The findings for unemployment are consistent with the GDP trends (Figure 4). In every case, the simulations indicate that unemployment will continue to fall as the economy recovers from the 1990-91 recession. In 1993, the predicted unemployment rate for the base case is 7.2 percent, and the three alternative cases range from 7.2 percent when the government spends the peace dividend directly, to 7.4 percent when the dividend is used for deficit reduction. The gap expands in 1994 and 1995 when the deficit reduction case has unemployment of 0.4 and 0.5 percentage points higher, respectively. The reason for these differences, as cited earlier, is that the model assumes a longer lag between defense cuts and offsetting growth in the deficit reduction case than in the other cases.[37] These results underscore the importance of labor market dynamics in understanding the unemployment effects of the drawdown. Everything else the same, policies that quickly create employment growth in industries and areas most affected by the drawdown will reduce the transitional impacts.

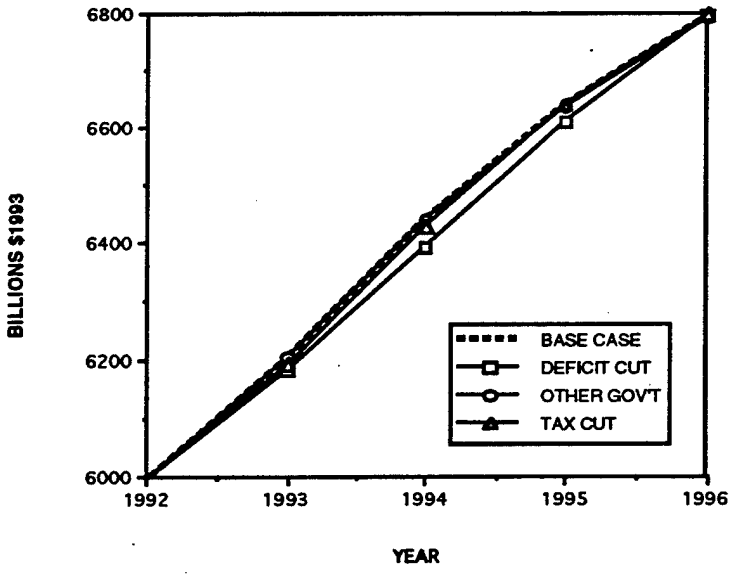

Figure 3.
GDP Trends During the Transition (QUEST)

[37] Eisner has estimated, for example, that reducing defense as a share of GNP by 1 percent would increase the unemployment rate from 0.4 to 0.6 percentage points. See Robert Eisner, "The Macroeconomic Consequence of Disarmament," *Challenge*, January-February 1991.

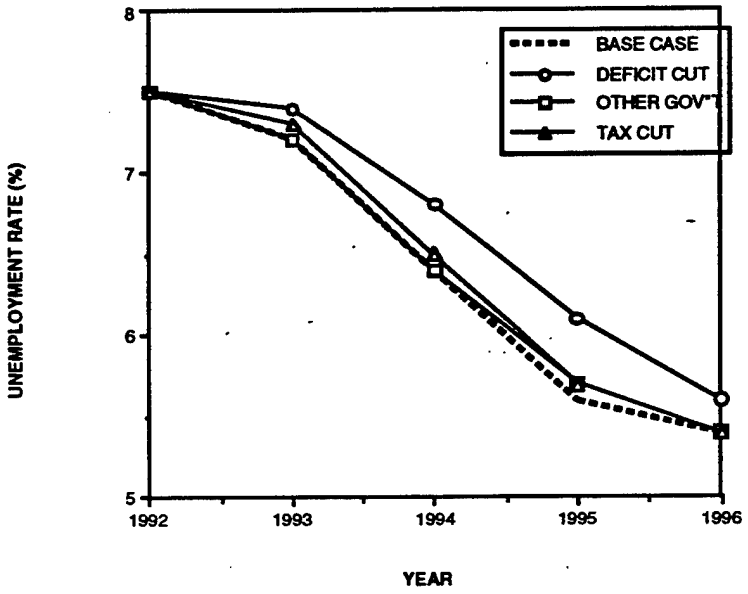

Figure 4.
Unemployment Trends During the Transition (QUEST)

The results under the alternative peace dividend options bracket the direct defense-related job separations estimated at the beginning of this section. There we estimated that the addition to unemployment accounted for by direct defense-related separations was about 0.19 percentage points. At the lower bound, the tax cut and government spending simulations estimate that about 0.1 percentage point is added to unemployment. At the upper bound, deficit reduction case yields unemployment rates that are 0.4 to 0.5 percentage points higher. These results can be reconciled in one of two ways with the structure of the QUEST simulation model. First, in the case of the tax cut and government consumption cases, the simulation model evidently assumes about a three-month average duration of unemployment for direct defense-related job losses. This average duration would reduce the calculated contribution of direct separations to unemployment from 0.19 percentage points to about 0.1 percentage point, thus making the two estimates consistent. Second, in the deficit reduction case the model either must assume about a one-year duration of unemployment for direct defense job losses, or it must assume that indirect job losses are roughly equal in magnitude to direct job losses. Either of these assumptions applied to the direct employment effect would double the calculated contribution of direct separations to unemployment from 0.19 percentage points to about 0.4 percentage points. We believe that both these

structural assumptions are probably too pessimistic, and therefore overstate the potential unemployment effects of the deficit reduction case.[38]

It would be prudent, nevertheless, for the Commission to be conservative in its estimates of the effects of the defense drawdown on the economy. Our analysis suggests that an extremely conservative upper bound estimate of the effect of the defense drawdown on unemployment effects would place the contribution at about 0.4 percentage points to 0.5 percentage points in 1993 and 1994, respectively.

Summary

One lesson illustrated by this transitional analysis is the need to examine both sides of the job market in assessing the transitional effects of the defense cuts. The key variables are the overall expansion of employment in the job market, and the time-phasing of the increases in demands caused by the peace dividend relative to the defense cuts.

Our analysis shows that defense-related job separations are relatively small compared with the overall national employment market, so we should not expect the contribution to national unemployment to be substantial. Growth will more than offset the separations from defense-related employment. At the industry level, even several defense-related industries will continue to grow as private demands more than offset defense demand cuts. At the state level, we also find that most of the states that are most susceptible to defense cuts have grown as fast or faster than the nation as a whole since 1985. The exceptions are Connecticut, Massachusetts and Mississippi, where defense drawdowns coincide with deeper economic problems. The main point is that the defense drawdown does not represent an unusually large shock to the economy, and has not created job market conditions that are substantially different in character and magnitude than the country deals with regularly. Indeed, the employment effects estimated here could be offset or be dominated by other factors that influence the economy.

This point is underscored by comparing the defense drawdown with other historical shocks to the economy. Today's cuts remain under half the pace of the cuts following the Korean and Vietnam conflicts, and are far less damaging than were the oil price shocks of the mid and late 1980s. There is little evidence to suggest that defense spending cuts have been more than a second-order drag on national employment growth.

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[38] Martin Feldstein for one argues that a credible governmental commitment to cut the deficit by half in five years would in fact provide a powerful short-term stimulus to the economy, because is would reduce long-term interest rates and quickly stimulate capital spending. Feldstein notes that defense spending cuts are only a small fraction of the needed cuts. Martin Feldstein, "A Deficit Reduction Plan to Stimulate the Economy," *The Wall Street Journal*, November 19, 1992, p A14.

CONCLUSIONS

By 1997 the defense budget will fall by $87 billion (1993$) relative to the 1991 level; this will reduce defense to about 3.5 percent of gross domestic product, far below the levels in recent decades. These savings represent a peace dividend, made possible because the nation no longer needs to maintain high Cold War levels of military forces. By the turn of the century, the sum of these yearly dividends will accumulate to over $600 billion.

There are a variety of ways the peace dividend could be used to increase current consumption or investment. If invested, the peace dividend will contribute measurably to the nation's rate of accumulation of capital — an essential ingredient for progress and economic growth. If invested wisely, earning normal rates of return based on historical experience, the peace dividend could increase the growth of the economy by about 0.2 percentage points per year. This would add about one percent to the total level of economic output by the end of the century — equal in 1993 terms to over $60 billion. These gains are perhaps disappointing to those who had hoped the peace dividend could provide an economic "silver bullet," but from a long-term perspective, the gains are significant.

Defense cuts, along with several other factors, have contributed to the slowdown of the U.S. economy, but defense is not the prime cause of the slowdown and probably is presenting a small but measurable drag on the current recovery. The short-run transition will force job separations over the next three years of a few hundred thousand people per year, and increase unemployment by perhaps as much as 0.4 percentage points. These transitional effects will dissipate by 1997. In some cases, the personal losses will be significant. Without belittling these personal experiences, we find that the separations are quite small compared with the numbers of people who regularly seek and find work in the United States. Bureau of Census statistics show that the flow into and out of unemployment equals well over 1.5 million people per month.[39] This monthly figure exceeds the estimated 1.4 million defense-related job separations projected over the next five years combined.

Our findings are consistent with those of several other studies that have examined the effects of the defense drawdown.[40] There is a general consensus

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[39] Data for 1986 provide a representative example for a relatively prosperous year when the average rate of unemployment was about 6 percent. There were 128 million people who either worked or looked for work in 1986. Of these, there were 20.7 million who experienced some unemployment -- about 16 percent of the labor force. About 5.7 million -- one in four -- experienced unemployment that exceeded six months, the rest found work in less time.

[40] Appendix D summarizes the results of six of these studies: Marion Anderson, Greg Bischak, and Michael Oden, *Converting the American Economy: The Economic Effects of an Alternative Security Policy*, (Lansing, MI: Employment Research Associates, 1991); Richard S. Belous, *Creating a Strong Post-Cold-War Economy*, (Washington, DC: National Planning Association,1990); Congressional Budget Office, *The Economic Effects of Reduced Defense Spending*, (Washington, DC: 1992); Edward Knight, Linda Levine, Brian Cashell, and Mark

that, if invested, the peace dividend could increase growth measurably. There also is a general consensus that economic growth will provide ample opportunities for the re-employment of people who lose their jobs due to the defense cuts, and that the short-run transitional contribution to unemployment will be modest.

Turning to the Commission's specific concerns, we find with respect to the pace of the drawdown that the current drawdown is proceeding at about half the pace of the steep cuts following Korea and Vietnam, which reached one percent of GNP per year. There is little hard evidence to suggest that the current drawdown was a major cause of the 1990-91 recession. The continuing cuts are a drag on the expansion of the economy, perhaps slowing this year's growth by as much as 0.4 percentage points, but it should remain a second-order effect at the currently planned pace. At the same time, our findings indicate a caution against faster cuts: History suggests that cuts on a par with the post-Korea and -Vietnam drawdowns could perhaps trigger a recession. Finally, with respect to the adequacy of the existing conversion assistance programs, we find that the scale of the drawdown and resulting unemployment are quite small on a national scale. This suggests the DCC's examination of alternative conversion assistance programs and policies should focus primarily on those that operate at the state and local level.

Jickling, *Defense Budget Cuts and the Economy*, (Washington, DC: Congressional Research Service, October 1992); Laurence H. Meyer, Fredric Q. Raines, "Does Defense Spending Crowd Out Economic Growth?," Paper presented at the *Western Economic Association International Conference*, July 1992; and Norman C. Saunders, "Defense Spending in the 1990s -- the Effect of Deeper Cuts," *Monthly Labor Review*, Volume 113, Number 10, October 1990, pp. 3-15.

GNP And Defense Spending

Table A-1.
GNP and Defense Spending

YEAR	GNP (BIL $1993)	DEFENSE OUTLAYS (BIL $1993)	DEF/GNP* (%)	ANNUAL CHANGE IN DEF/GNP** (%)
1948	1,628	68	4.2	--
1949	1,629	80	4.9	0.7
1950	1,767	87	4.9	0.0
1951	1,951	137	7.0	2.1
1952	2,027	249	12.3	5.3
1953	2,108	282	13.4	1.1
1954	2,080	258	12.4	-1.0
1955	2,195	247	11.3	-1.1
1956	2,242	236	10.5	-0.7
1957	2,278	241	10.6	0.0
1958	2,261	236	10.4	-0.1
1959	2,393	239	10.0	-0.5
1960	2,446	239	9.8	-0.2
1961	2,511	241	9.6	-0.2
1962	2,643	262	9.9	0.3
1963	2,751	266	9.7	-0.2
1964	2,898	265	9.1	-0.5
1965	3,067	241	7.9	-1.3
1966	3,244	267	8.2	0.4
1967	3,336	314	9.4	1.2
1968	3,476	344	9.9	0.5
1969	3,559	334	9.4	-0.5
1970	3,549	309	8.7	-0.7
1971	3,650	281	7.7	-1.0
1972	3,833	262	6.8	-0.9
1973	4,031	239	5.9	-0.9
1974	4,009	235	5.9	-0.1
1975	3,959	230	5.8	-0.1
1976	4,153	222	5.3	-0.5

YEAR	GNP (BIL $1993)	DEFENSE OUTLAYS (BIL $1993)	DEF/GNP* (%)	ANNUAL CHANGE IN DEF/GNP** (%)
1977	4,347	225	5.2	-0.2
1978	4,576	226	4.9	-0.2
1979	4,689	235	5.0	0.1
1980	4,682	242	5.2	0.2
1981	4,771	253	5.3	0.1
1982	4,651	274	5.9	0.6
1983	4,817	291	6.0	0.1
1984	5,143	302	5.9	-0.2
1985	5,316	321	6.0	0.2
1986	5,460	339	6.2	0.2
1987	5,648	340	6.0	-0.2
1988	5,900	339	5.7	-0.3
1989	6,048	340	5.6	-0.1
1990	6,134	324	5.3	-0.3
1991	6,083	324	5.3	0.0
1992	6,147	306	5.0	-0.3
1993(est)	6,245	278	4.5	-0.5
1994(est)	6,370	260	4.1	-0.4
1995(est)	6,498	250	3.8	-0.2
1996(est)	6,628	243	3.7	-0.2
1997(est)	6,760	237	3.5	-0.2

(est) indicates magnitudes after 1992 are estimated.

* GNP estimates assume 2 percent real growth after 1992. Defense spending is based on the President's defense budget for FY 1993.

** Equals the year to year differences from the preceding column.

Sources: Economic Report of the President, DoD Comptroller, and Isadore Greenberg, Lawrence Schwartz, Peter Kostivk, and Earl R. Wingrove, "The DoD Drawdown: Planned Spending and Employment Cuts," Logistics Management Institute Report DC 201R1, January 1993.

The Lift Model

LIFT (Long-term Interindustry Forecasting Tool) is designed to produce year-by-year simulations of outputs, intermediate sales, employment, investment in physical capital, labor productivity, and other selected variables for the U.S. economy over periods of up to 13-18 years into the future (i.e., the present through 2005-2010). The simulations can be viewed as forecasts conditional upon the assumptions and structure of the model and subject to the limitations of the theory and data used.

LIFT uses regression-based econometrics to estimate aggregate equations, such as those for the personal savings rate, average nominal hourly compensation in manufacturing, short- and long-term interest rates, dividend payouts, and some NIPA items that cannot be obtained by adding up industry detail. It uses the input-output (I-O) matrix A to derive outputs for 83 product groups and also to derive product prices from the dual equation. Thus, not only outputs and intermediate sales but also prices and values added are produced for 83 sectors; in addition, inventory changes, equipment investment, construction spending, employment, and exports and imports are all obtained for these 83 sectors. The model, therefore, has a considerable potential benefit for the Defense Conversion Commission (DCC) study in that it can show how the effects of the defense drawdown may effect activity (production, employment, etc.) in a wide range of industries over annual sequences of intermediate duration.

LIFT combines the macro and the interindustry relationships directly in one integrated approach, which is in contrast to an earlier procedure that uses an I-O model to work out the industrial implications of an aggregate macroeconomic model. The integrated approach is much more demanding and hence more costly and time-consuming to implement than is the two-model approach, in several dimensions: it requires the development of more detailed data, more analysis and estimation of industry equations, more checking and adjusting the results, and more computer time.

The payoff on these laborious efforts is primarily the presumption of considerable internal consistency of the estimation and simulation results, which the two-model approach may well be largely lacking. This claim made in the literature by Almon and his coworkers is both important and well-taken, particularly for users whose interests center on the interindustry effects of specific macroeconomic or policy changes. On the other hand, as the authors of the INFORUM models also correctly state, there is not necessarily a significant gain in the accuracy of aggregate forecasting to be expected from the integrated sectoral model. The latter may or may not have smaller errors

than the less consistent and less carefully built — but for this very reason also often more timely — aggregate model with an appended I-O analysis.

The dual equations for quantities and prices assure under certain simplifying assumptions that the costs of the required inputs are defrayed from the proceeds of selling the outputs. But the fixed-coefficient assumption of linear I-O models, while a convenient empirical shortcut, is unsatisfactory on theoretical grounds because it does not allow for input substitution resulting from changes in technology and relative prices. In this regard, the I-O models conflict with the neoclassical production functions, which have their own restrictions but do allow for input substitution. In practice, the I-O coefficients have only limited and short-lived relative stability; but estimation of complete new I-O tables, being costly and time-consuming, can only be attempted once every few years, so this information is often obsolete. The LIFT model incorporates changes in the I-O coefficients year-by-year, which may help, but these are more or less mechanical projections and it is not clear how good they are.[1]

According to Almon (Economic Systems Research, Vol. 3, No. 1, p. 2, 1991), the INFORUM models "may definitely show business cycles." But we see little evidence of cyclical behavior in the results of the LIFT simulations examined so far, which are clearly dominated by longer trends. It is in such movements over periods of intermediate length that the main value of the LIFT runs for the DCC study will likely be located. But in general, shorter-term forecasts are more accurate than are the long ones, and the IDA research is concerned not only with the "key long-run variables" but also prominently with the "short-run transmission mechanism" of the linkage between the defense and the economy. Therefore, a more cyclically sensitive model is needed. We therefore also employed INFORUM's aggregative model named QUEST, which is used to predict constant-dollar and current-dollar GNP and its expenditure and income components by quarters over the next two years (see Outlook Seminar, December 1991, with forecasts for 1992.1 -1993.4). This model is described in Appendix C.

The following provides a brief technical description of the LIFT model. It outlines each of the three components of the model: the real side, the price side, and the income side.[2]

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1 The fixed-coefficient problem is, of course, an old and much debated one. See, for example, Victor Zarnowitz, "Technology and the Price Structure in General Equlibrium Systems," *The Review of Economic Studies*, Vol. 23, No. 2, pp. 109-125. See also the independent proofs of the "non-substitution theorem" by Arrow, Samuelson, and Koopmans, and articles by Leontief and Brody in the *New Palgrave*, Vol. 2, pp. 860-864, and Vol. 3, pp. 957-960, 1987.

2 The discussion here borrows heavily from McCarthy, M., "LIFT: INFORUM's Model of the U.S. Economy," *Economic Systems Research*, Vol. 3, No. 1, 1991.

THE REAL SIDE

The real side is modeled in 83 product (as opposed to industry) sectors. Final demand is separated into 7 broad categories:

1. Personal consumption expenditures (PCE)
2. Producer durable equipment (PDE)
3. Construction (CST)
4. Inventory changes (VEN)
5. Exports (EXP)
6. Imports (IMP)
7. Government purchases of goods and services(GOV).

The first three final demand categories have sectoral schemes that are distinct from the 83 basic product sectors. PCE's are divided into 78 National Income and Product Accounts (NIPA) accounts. The demand for each account is estimated as a function of relative prices (compared with other PCE's), disposable income, population, and various demographic variables.

PDE's are estimated for 55 industries, aggregates of the 83 LIFT product sectors. Investment is modeled as a function of changes in industry output, and the relative prices of capital, labor, and energy. The equations for the private residential construction categories are functions of income, interest rates, the stock of housing, and demographic data. The ones for the private non-residential categories are functions of industry outputs, interest rates, and current stocks. The public construction categories are exogenously fixed. Once LIFT has calculated forecast values for each category of PCE, PDE, and CST, it translates those values through exogenous bridge matrices into final demands in the 83 LIFT product sectors.

VEN, IMP, EXP, and GOV also are tracked at the 83 LIFT product sectors. The determinants of inventory changes are industry output, interest rates, and the stock of inventories. Exports are a function of foreign demand (in part modeled in the INFORUM International System), and relative prices. Imports are a function of domestic demand and relative foreign to domestic prices. GOV's are divided into 4 sub-groups: federal defense, federal non-defense, state and local education, and state and local other. Demand in all of the government categories are specified exogenously.

To compute output , the well-known Input-Output identity is solved:

$$\mathbf{x} = \mathbf{A}\mathbf{x} + \mathbf{y} \qquad (1)$$

where **A** is the input-output matrix, **y** is total final demand, and **x** is output. Note that because the equations for IMP and VEN, two of the components of final demand, depend on output, they must be solved simultaneously with output.

The real side also forecasts productivity for each of the 83 product sectors. Productivity is modeled as a function of trend and changes in output. Dividing output by productivity yields employment.

THE PRICE-INCOME SIDE

Let **p** and **v** be (1x*n*) row vectors representing, respectively, the unit prices and the unit value-added costs by sector. To determine **p**, the price-income side solves the dual equation to (1):

$$\mathbf{p} = \mathbf{pA} + \mathbf{v} \qquad (2)$$

Equation (2) is simply the identity that the price of a good is equal to the sum of expenditures on materials and value-added. Value-added consists of labor compensation, capital income, and indirect business taxes. Because statistical data related to value-added are generally available in an *industry* rather than a product classification scheme, LIFT models valued-added in some 40 industries and uses an *industry-to-product* bridge to convert the information into the 83 product sectors. Labor compensation is determined by employment[3] (in hours) and the industry wage rate. The industry wage rates are functions of either aggregate manufacturing or non-manufacturing wages, industry output, foreign trade, inflation, and unemployment. Capital income consists of profits, interest payments, and assorted items such as subsidies and business transfer payments. Profits are functions of material and labor costs, industry growth, changes in unemployment, etc. Interest payments are a function of interest rates.

To summarize, the price-income side of LIFT creates industry forecasts of value-added and then solves (2) to determine the unit prices for each of the 83 LIFT product sectors.

THE ACCOUNTANT

The main purpose of the accountant is to compute the aggregate national accounts by summing up across the relevant sectors. The accountant is also responsible for computing unemployment, the savings rate, and the various short and long-term interest rates. Calculations of the various income measures, taxes, and government spending are done here. The most important of these is the savings rate, since it serves as the major equilibrating device in LIFT. It moves countercyclically to choke off aggregate demand when unemployment is low and to raise aggregate demand when unemployment is high.
Thus, LIFT is capable of exhibiting business cycle characteristics, though on

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3 Employment is supplied by the real side.

the whole they tend to be much less noticeable compared to quarterly models. Over a period of many years, the LIFT model will evolve from its initial conditions to a long-run fall employment equilibrium. Hence, the model provides a useful basis for comparing how alternative policies shape the economy in the long run.

For a particular forecast, LIFT iterates through the real side, the price-income side, and the accountant until a convergence criterion is met.

The Quest Model

QUEST (QUarterly Economic STructural model) is a personal computer-based quarterly model of the U.S. economy supported by the INFORUM group at the University of Maryland.[1] QUEST, like most other short-term macro models, works in the framework of the National Income and Product Accounts (NIPA).

One important feature of QUEST is that it uses structural economic relationships. It does not rely on the auto correlation of economic variables for forecasting, as does many short-term economic forecasting models. These models use lagged variables for forecasting future trends and consequently work well only a few quarters into the future. In addition, such models are not well suited for examining "what if" scenarios if these deviate much from the economic environment used to estimate the model's equations. QUEST is thus a theoretically superior model for assessing the effects of the defense drawdown. The disadvantage of QUEST is that it is not as well known as other models that have been used for this purpose.

Quest business cycle forecasts assume the economy oscillates around the long-run growth trend in potential GNP. Its view of short-term fluctuations is Keynsian in most respects. The principal instruments for the movements are investment and net exports. In slack times, the model assumes that the real value of the money supply will increase, stimulating added consumer spending and investment. This will trigger added investment through the mechanism of the investment accelerator. Output begins to grow faster than the long-run trend in potential output. As output approaches its potential, however, inflation quickens and the real value of money begins to fall. Tight money stimulates added savings, retards investment, causes exchange rates to rise, and this in turn reduces exports and stimulates imports. Together, these factors begin a downturn, which is accentuated by the investment accelerator. Once output falls below the potential, the business cycle begins anew.

QUEST does not provide the industry detail that LIFT posseses. The current version of the model is based on 1987$. The following list, quoted from Almon, summarizes the major behavioral characteristics of QUEST:

- A potential real GDP, which is essentially exogenous.

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[1] The discussion in this appendix is taken from Almon, C., *The Craft of Economic Modeling*, Needham Heights: Ginn Press, 1990.

- A strong accelerator in the investment function that pushes the economy up toward that potential if it is well below it. But the investment generated by growth at the potential rate may be insufficient to hold the economy at the potential indefinitely.
- An inflation function that pushes up prices as potential output is approached.
- A corporate profits function that captures a significant share of the increase in prices as profits and a dividend function that keeps those profits as retained earnings. Thus, the inflation chokes off the boom.
- Terms in the investment equations that make them depend on monetary ease or stringency.
- A savings rate function that smoothes the effect of changes in income, shows the stimulation of easy money availability on consumer spending, and the retarding influence of inflation on consumer spending.
- Interest rates that depend on inflation and monetary ease or tightness.
- Exchange rates that depend on real interest rates and the trade balance. Exchange rates then influence strongly both exports and imports.
- Inflation that is determined primarily by "expectations" of inflation -- actually lagged values of inflation -- and by "capacity shortage," the difference between actual gross private product and its potential.

Comparative Studies

A number of studies have examined the macroeconomic impacts of lower defense budgets. In general, the results of these studies are consistent with our simulation results discussed in the main report, with more detailed results tabled in Appendices E and F. This appendix describes both general conclusions and quantitative results from six studies conducted by:

- Congressional Budget Office (CBO),
- Congressional Research Service (CRS),
- Bureau of Labor Statistics (BLS),
- National Planning Association (NPA),
- Employment Research Associates (ERA), and
- Meyer and Raines.

Table 1 describes the main assumptions underlying each study. While all six studies focus on the impact of alternative levels of defense spending, the assumptions underlying these analyses vary from study to study. The key differences involve the macroeconomic model used, the time frame examined, the magnitude of the defense cuts, the alternative uses for defense savings -- either deficit reduction, tax cuts, or other government spending -- and the overall macroeconomic conditions.

Because of these differences it is not possible to directly compare the quantitative results of each study (though some comparisons and individual results will be presented below). However, broad conclusions can be generalized across all studies. These studies conclude that:

- The macroeconomic impacts of defense cuts are small.
- The general economic landscape has more impact on growth and productivity than do defense cuts.

Table 1.
Major Assumptions of Prior Studies

	Model	Timeframe	Defense Cuts	Deficit Reduction	Tax Cuts	Other Gov't Spending
CBO	DRI McKibben-Sachs Global Model	1991-1997	3 & 6% annual	2 cases (alt defense cuts)	-	
CRS	DRI	1991-1997	3.9 & 10% annual	2 cases (alt defense cuts)		
BLS	DRI	1988-2000	3.1 & 4% annual	2 cases (alt defense cuts)	1 case (4% cut)	3 cases (alt spending patterns)
NPA	NPA Data Services	1990-2000	10, 20 & 30% cumulative	3 cases (alt defense cuts)		6 cases (alt defense cuts & economic landscape)
ERA	Multi-regional Forecast Simulation Model	1991-1994	24% cumulative			1 case
Meyer and Raines	Washington University Macro Model	1992-2001	30% cumulative	1 case		

- The impact of defense cuts depends on how the "peace dividend" is used -- whether for deficit reduction, tax cuts, or to increase other government spending.
- Defense cuts can be beneficial to the economy in the medium to long run.

- Discontinuities that will arise as a result of defense cuts are more likely to occur at the micro level -- within individual industrial or occupational sectors -- and will depend on the nature, size and timing of budget reductions.

A comparison of the gross national product projections illustrates these conclusions. Consider first the long run results. IDA's analyses are based on the President's proposed annual defense cuts of about 4 percent per year from 1992 to 1997, a 22 percent cumulative reduction. First we considered the effect if the "peace dividend" were consumed. Our simulations indicate that by 2001, this would reduce GNP by 0.2 percent below the base case, in which defense is held constant at 1992 levels. If the "peace dividend" instead were invested, GNP in 2001 would increase by between 0.7 percent to 1.1 percent. These results bound our estimates of the long-run economic impact of the defense drawdown.

Two of the studies that focus on the long-run effects of the drawdown obtain results roughly consistent with our projections under the assumption that the peace dividend is consumed. The Bureau of Labor Statistics (BLS) study predicted 0.3 percent lower GNP in 2000 for a defense cut of 4 percent annually from 1989 to 2000, as compared to constant defense spending at 1989 levels. BLS also predicted a 0.5 percent reduction in GNP in 2000 when defense savings are used to reduce personal income taxes. Similarly, the National Planning Association (NPA) examined a 30 percent cumulative reduction in defense from 1989 to 2000, and found a 0.5 percent reduction in GNP at the turn of the century, as compared to constant defense spending at 1989 levels. Both BLS and NPA reported a 0.1 percent reduction in GNP for the case in which other government spending is increased. These estimates -- reductions of 0.1 to 0.5 percent in GNP -- are quite similar to our simulation results. Given the different time frames, different models used, and different assumptions regarding the magnitude of the defense cuts, these studies provide a highly consistent view of the likely long-run effects of policies that would consume the peace dividend.

The third long-run study, Meyer and Raines, examines deficit reductions that are invested. They find that a 30 percent cumulative reduction in defense spending from 1992 to 1997 would increase GNP by 0.6 percent in 2001 as compared to a base case that assumes defense spending is fixed at 1991 levels. Again, the results are similar to the findings of our simulations, which find GNP levels are increased by between 0.7 and 1.1 percent.

The BLS and Congressional Research Service (CRS) studies provide estimates of the short-run effects of the drawdown. Both assume the peace dividend is devoted to deficit reduction. IDA's projections for the deficit reduction case, using the QUEST model, show that relative to the base case GNP growth rates are reduced by about 0.4 percentage points in 1993 and 1994, relative to the base case. (The base case predicts growth of 3.5 percent in 1993, the defense cuts reduce growth to about 3.1 percent. In 1994, the drawdown reduces predicted GNP growth from 3.8 to 3.4 percent.)

Although the CBO study did not report findings in terms of growth rates, we have calculated implied growth rates for their simulations. These indicate that a 3 percent cut in defense spending from 1992 to 1997 reduces GNP growth by about 0.7 percentage points in each of the first two years of the simulated drawdown. The Congressional Research Service, assuming 4 percent annual reductions in the defense budget, also finds GNP growth is reduced by about 0.7 percentage points per year in each of the first two years. Like our simulations, CBO finds that growth rebounds to base case rates (or higher) in the third year. The CRS study finds that growth remains below base case levels for several years.

The IDA projections of the slowdown in economic growth may be below those of these studies because of the difference in the period studied, differences in the models used to conduct the simulations, or differences in the economic assumptions used in the models. In particular, the parameters of economic models are continually updated to reflect changing economic conditions, so the different time frames of these studies might be an important factor in explaining the differences. Despite these differences, the qualitative results of these studies are consistent. In each case they indicate that the economy will continue to grow despite the drawdown, but that the drawdown has slowed growth by a measurable degree -- somewhere in the range of 0.4 to 0.7 percentage points per year.

Moreover, it should be noted that neither the CBO nor CRS study estimates the effect of peace dividend options other than deficit reductions. However, our simulation cases found that the drag on growth is far smaller when the peace dividend is used for tax reduction or transferred to other government spending. In practice, the peace dividend will probably be spread across all of these options. Hence, the CBO, CRS and IDA deficit reduction projections represent upper bound estimates of the true effect of the drawdown.

As in IDA's analyses, several of these studies do examine the effect of tax cuts and increases in other government spending as well. Looking across these studies, general conclusions as to the impact of these alternatives can be found. For example:

- When defense savings are applied to deficit reduction, lower inflation and interest rates lead to an increase in investment and capital formation; there are short-term, modest recessionary impacts, but economic growth recovers in the long run.
- In the case of tax cuts -- in this case a personal tax cut -- an increase in personal consumption and investment partially offsets defense cuts, while some resources are used to increase personal savings; short-run effects are less adverse, but GNP growth for the most part stays the same in the long run.

- If federal priorities shift to investment in infrastructure, the investment spending stimulates long-run growth, potentially above the levels that might be achieved through deficit reduction only. However, if government spending is targeted to transfer payments that increase personal consumption, economic growth will be lower in the long run.

Tables 2 through 7 show quantitative results for selected simulations from each study. In each table, base case results are compared with alternative cases that assume different levels of defense spending,-and for some studies different uses for the peace dividend. Simulation assumptions are consistent with those presented earlier in Table 1.

Table 2.
Congressional Budget Office Simulation Results
(differences from base-case results)

	3 percent defense cut				6 percent defense cut			
	1991	1993	1995	1997	1991	1993	1995	1997
Real GNP (% change)								
DRI Model	0.6	-0.7	-0.6	-0.6	0.6	-0.7	-1.2	-1.2
MSG Model	0.7	-0.6	-0.5	-0.2	0.8	-0.5	-0.8	-0.5
Real Investment (% change)								
DRI Model	0.1	-0.4	0.1	0.2	0.1	-0.4	0.0	-0.4
MSG Model	0.1	-0.1	0.0	0.2	0.0	-0.1	0.0	0.2
Real Net Exports (% change)								
DRI Model	0.1	0.1	0.2	0.4	-0.1	0.1	0.4	0.7
MSG Model	-0.1	0.2	0.3	0.3	0.1	0.1	0.2	0.4
Employment (% change)								
DRI Model	0.2	-0.2	-0.2	-0.1	0.2	-0.2	-0.4	-0.4
MSG Model	0.3	-0.2	-0.2	-0.1	0.3	-0.2	-0.4	-0.3
Reduction in Federal Deficit (bill of current $)								
DRI Model	-13.9	4.0	39.6	65.8	-13.9	4.9	56.9	134.5
MSG Model	-23.8	6.5	35.0	63.2	-25.0	2.8	51.7	108.5

[1]The base case assumes constant real defense budget authority, at the 1991 level, from 1992 to 1997.
Source: Congressional Budget Office, *The Economic Effects of Reduced Defense Spending*, Washington, DC: 1992.

Table 3.
Congressional Research Service Simulation Results

	1992	1993	1994	1995	1996	1997
Real Gross National Product (% Change)						
No Defense Cut	3.0	4.2	3.3	2.8	2.3	2.8
3.9% Cut	2.4	3.5	3.0	3.0	2.5	2.9
10% Cut	2.3	3.2	2.7	2.5	2.1	2.7
Civilian Unemployment Rate (%)						
No Defense Cut	6.5	5.6	5.1	5.1	5.3	5.3
3.9% Cut	6.6	6.1	5.7	5.6	5.8	5.8
10% Cut	6.7	6.2	6.0	6.0	6.3	6.4
Federal Budget Surplus (% bil)						
No Defense Cut	-220.5	-216.0	-222.3	-225.0	-241.5	-247.8
3.9% Cut	-208.8	-195.4	-185.1	-171.6	-171.2	-162.9
10% Cut	-205.1	-187.4	-168.7	-140.8	-124.6	-96.6

Source: Knight, Edward, Linda Levine, Brian Cashell, and Mark Jickling, *Defense Budget Cuts and the Economy*, Washington, DC: Congressional Research Service, October 1992.

Table 4.
Bureau of Labor Statistics Simulation Results
(Billions of 1982 Dollars, 1988 and 2000)

		2000						
	1988	Base[1]	Low-1	Low-2	Low-3	High-1	High-2	High-3
Gross National Product	4,024	5,222	5,215	5,226	5,205	5,231	5,223	5,243
Consumption	2,598	3,357	3,339	3,359	3,363	3,367	3,356	3,354
Investment	716	956	962	961	966	953	955	955
Government	785	859	799	859	800	896	859	895
Exports	530	880	904	875	890	868	883	877
Imports	605	829	795	828	816	848	830	838
Unemployment Rate	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Civilian Employment	115.0	133.3	133.6	133.6	133.7	133.2	133.2	133.3
Federal surplus/deficit	-146.0	26.4	98.8	22.0	25.9	-59.0	29.8	27.2

1 The base case assumes a 1.3 percent annual decline in defense spending from 1988 to 2000.
Low-1 assumes a 4 percent annual decline in defense spending with savings applied to deficit reduction.
Low-2 assumes a 4-percent annual decline in defense spending and an offsetting increase in other government purchases of goods and services.
Low-3 assumes a 4-percent annual decline in defense spending offset by a cut in personal taxes.
High-1 assumes no change in defense spending at 1989 levels with savings applied to deficit reduction.
High-2 assumes no change in defense spending at 1989 levels with an offsetting increase in other government spending.
High-3 assumes no change in defense spending at 1989 levels offset by a cut in personal taxes.

Source: Saunders, Norman C., "Defense Spending in the 1990s -- the Effect of Deeper Cuts," *Monthly Labor Review*, Volume 113, Number 10, October 1990, pp. 3-15.

Table 5.
National Planning Association Simulation Results

	Base[1]	Case 1	Case 2	Case 3	Case 4
Real GNP, 1990-2000 (% change)	32.2	31.6	32.1	32.0	32.2
Employment, 1990-2000 (growth in mill. jobs)	20.2	19.6	19.7	18.1	18.2
Federal Budget Deficit in 2000 (billions of 1982 dollars)	-20	+84	+5	+15	-22

1 The Baseline scenario assumes real defense outlays remain constant at 1989 levels through 2000.
In Case 1, defense spending is reduced by 30 percent; savings are applied to deficit reduction.
In Case 2, defense spending is reduced by 30 percent; social spending is increased by 30 percent.
In Case 3, defense spending is reduced by 10 percent; savings are applied to deficit reduction.
In Case 4, defense spending is reduced by 10 percent; social spending is increased by 10 percent.

Source: Belous, Richard S., *Creating a Strong Post-Cold War Economy*, Washington DC: National Planning Association, 1990.

Table 6.
Employment Research Associates Simulation Results
(net effect in billions of current dollars)[1]

	1991	1992	1993	1994
GNP	+9.2	+15.9	+19.3	+26.0
Personal Disposable Income	+5.2	+9.0	+10.9	+15.1
Private Fixed Investment	+1.7	+3.1	+3.3	+4.7
Producers' Durables	+1.2	+2.2	+2.3	+3.2

(annual average, 1991-1994)

Jobs lost from military cuts	-1,688,000
Jobs gained from civilian spending increases	+2,165,000
Net jobs gained	+477,000

1 Reductions in the defense budget of an average of $70 billion annually is shifted to spending on education, infrastructure, civilian research and development, and the environment.

Source: Anderson, Marion, Greg Bischak, and Michael Oden, *Converting the American Economy: The Economic Effects of an Alternative Security Policy*, Lansing, MI: Employment Research Associates, 1991.

Table 7.
Meyer and Raines Simulation Results
(net effect relative to base case in 2001)[1]

GNP	+0.6 percent
Equipment Investment	+23 percent
Plant Investment	+15 percent
Private, non-farm output	+1.3 percent

1 The base case assumes that real defense spending is fixed at 1991 levels from 1992 to 1997, then grows at the rate of increase in real GDP from 1998 to 2001. The alternative case assumes a 30 percent cumulative reduction in defense spending from 1991 to 1997, then defense spending maintains a constant share of GDP through 2001.

Source: Meyer, Laurence H. and Fredric Q. Raines, "Does Defense Spending Crowd Out Economic Growth?," *Western Economic Association International Conference*, July 1992.

Lift Simulation Results

This appendix presents a series of tables reflecting base case simulations and the alternative cases, that is, Deficit Reduction -- Consumption; Tax Cut -- Consumption; Other Government -- Consumption; Deficit Reduction -- Investment; Tax Cut -- Investment; and Other Government -- Investment.

Base Case

Gross Domestic Product: Components

	1992	1993	1995	1997	1999	2001	2003	2005
Personal Consumption Expenditures	2743.42	2790.89	2889.57	3015.95	3123.79	3238.13	3347.76	3454.31
Gross Private Domestic Investment	662.39	781.16	870.53	893.63	954.29	1003.74	1053.20	1101.92
Structures	260.37	298.46	336.13	359.71	377.57	391.66	407.31	418.14
Producers' durable equ	385.09	448.22	506.58	511.85	554.04	589.99	624.21	662.02
Inventory change	16.93	34.48	27.83	22.06	22.68	22.09	21.69	21.75
Exports of goods & services	676.13	706.57	759.80	807.43	849.16	890.86	939.87	995.61
Imports of goods & services	713.15	747.58	786.15	819.56	863.08	906.49	947.80	989.89
Federal Government	824.58	841.30	864.81	887.93	911.05	933.95	956.64	979.33
Federal	327.99	329.00	331.03	333.72	336.42	339.08	341.69	344.31
Defense	240.73	240.73	240.73	240.73	240.73	240.73	240.73	240.73
State and local Government	496.59	512.29	533.78	554.20	574.63	594.87	614.94	635.02
Gross Domestic Product	4174.05	4358.59	4593.58	4779.71	4969.32	5154.31	5343.67	5535.41

Financial Variables

Savings rate	4.30	4.94	5.94	5.52	5.75	5.91	6.22	6.61
3 mo. Treasury bill rate	3.90	5.32	4.63	4.19	4.07	4.15	4.40	4.91
10 year Treasury bond rate	7.50	7.21	6.54	6.44	6.53	6.69	6.92	7.32

Base Case

Employment

	1992	1993	1995	1997	1999	2001	2003	2005
Unemployment rate	6.75	6.01	5.74	5.58	5.52	5.45	5.17	4.87
Unemployed, millions of people	8.57	7.77	7.67	7.67	7.77	7.86	7.63	7.33
Civilian jobs (millions)	123.73	126.91	131.58	135.20	138.64	142.06	145.44	148.72
Private sector jobs	104.62	107.55	111.75	114.94	117.96	121.01	124.07	127.04
Agric,Mining,Structures	10.06	10.47	11.02	11.30	11.62	11.88	12.15	12.37
Durable goods mfg	10.93	11.38	11.95	11.92	11.99	12.04	12.08	12.16
Non-durable goods mfg	7.86	7.93	7.96	7.91	7.83	7.74	7.64	7.54
Transp,Communic,Utilities	6.41	6.52	6.72	6.80	6.91	7.02	7.13	7.24
Trade	28.03	28.81	29.82	30.78	31.58	32.43	33.27	34.06
Finance,Insurance,Real Est	7.47	7.72	8.09	8.40	8.69	8.97	9.24	9.50
Medicine & Education	15.06	15.33	15.86	16.49	17.04	17.64	18.29	18.91
Domestic servants	1.42	1.42	1.42	1.41	1.40	1.40	1.39	1.38
Business,Repair,Oth ser	17.38	17.98	18.93	19.93	20.92	21.90	22.89	23.88
Civilian govt. jobs	19.12	19.36	19.83	20.26	20.68	21.05	21.37	21.68
Federal defense	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Military jobs	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Labor Productivity	12.97	13.16	13.37	13.58	13.81	14.03	14.24	14.47
Civilian Labor Force (millions)	126.90	129.26	133.78	137.34	140.84	144.32	147.44	150.40

1. Tax Cut–Consumption

Gross Domestic Product: Components

	1992	1993	1995	1997	1999	2001	2003	2005
Personal Consumption Expenditures	2743.42	2793.86	2922.75	3054.65	3168.51	3280.59	3390.25	3496.41
Gross Private Domestic Investment	662.39	779.25	880.44	896.13	960.73	1008.04	1058.74	1107.77
Structures	260.37	299.29	340.73	363.67	382.58	395.94	412.18	422.97
Producers' durable equ	385.09	445.89	511.54	510.97	555.44	590.17	624.90	663.04
Inventory change	16.93	34.07	28.18	21.49	22.72	21.93	21.66	21.76
Exports of goods & services	676.13	706.67	760.58	808.50	850.24	891.93	940.93	996.82
Imports of goods & services	713.15	746.29	790.12	820.29	865.40	908.05	949.47	991.57
Federal Government	824.58	825.72	825.28	833.36	856.48	879.39	902.07	924.76
Federal	327.99	313.43	291.50	279.16	281.86	284.51	287.13	289.75
Defense	240.73	225.15	201.20	186.16	186.16	186.16	186.16	186.16
State and local Government	496.59	512.29	533.78	554.20	574.63	594.87	614.94	635.02
Gross Domestic Product	4174.05	4345.42	4593.63	4766.43	4964.41	5145.79	5336.29	5528.07

Financial Variables

Savings rate	4.30	5.00	6.01	5.49	5.76	5.88	6.19	6.57
3 mo. Treasury bill rate	3.90	5.15	4.46	3.94	4.00	4.02	4.27	4.76
10 year Treasury bond rate	7.50	7.10	6.37	6.31	6.48	6.64	6.84	7.24

Tax Cut--Consumption

Employment

	1992	1993	1995	1997	1999	2001	2003	2005
	—	—	—	—	—	—	—	—
Unemployment rate	6.75	6.23	5.70	5.64	5.42	5.44	5.14	4.85
Unemployed, millions of people	8.57	8.06	7.64	7.77	7.66	7.86	7.59	7.32
Civilian jobs (millions)	123.73	126.76	131.92	135.43	139.09	142.40	145.80	149.06
Private sector jobs	104.62	107.43	112.15	115.23	118.46	121.40	124.50	127.44
Agric,Mining,Structures	10.06	10.45	11.01	11.25	11.58	11.83	12.10	12.32
Durable goods mfg	10.93	11.32	11.87	11.75	11.84	11.89	11.94	12.02
Non-durable goods mfg	7.86	7.92	7.99	7.93	7.86	7.76	7.66	7.56
Transp,Communic,Utilities	6.41	6.51	6.71	6.79	6.91	7.02	7.12	7.23
Trade	28.03	28.82	30.09	31.08	31.95	32.75	33.60	34.37
Finance,Insurance,Real Est	7.47	7.72	8.14	8.46	8.75	9.04	9.30	9.57
Medicine & Education	15.06	15.33	15.96	16.63	17.22	17.80	18.46	19.08
Domestic servants	1.42	1.42	1.42	1.41	1.40	1.40	1.39	1.38
Business,Repair,Oth ser	17.38	17.95	18.97	19.95	20.97	21.93	22.92	23.91
Civilian govt. jobs	19.12	19.33	19.77	20.20	20.62	20.99	21.31	21.62
Federal defense	0.85	0.82	0.79	0.79	0.79	0.79	0.79	0.79
Military jobs	1.99	1.88	1.74	1.72	1.72	1.72	1.72	1.72
Labor Productivity	12.97	13.15	13.36	13.57	13.80	14.01	14.23	14.45
Civilian Labor Force (millions)	126.90	129.40	134.08	137.67	141.17	144.65	147.77	150.73

2. Deficit Reduction–Consumption

Gross Domestic Product: Components

	1992	1993	1995	1997	1999	2001	2003	2005
Personal Consumption Expenditures	2743.42	2792.66	2921.85	3056.44	3166.91	3278.35	3390.18	3495.22
Gross Private Domestic Investment	662.39	778.61	880.50	899.87	961.64	1006.06	1060.24	1109.74
Structures	260.37	299.34	340.87	364.58	382.92	395.64	412.67	423.45
Producers' durable equ	385.09	445.25	511.43	513.38	555.94	588.68	625.69	664.38
Inventory change	16.93	34.02	28.21	21.91	22.78	21.74	21.87	21.91
Exports of goods & services	676.13	706.72	760.64	808.75	850.55	892.16	941.19	997.21
Imports of goods & services	713.15	745.74	789.60	821.30	864.62	906.35	949.26	990.87
Federal Government	327.99	313.43	291.50	279.16	281.86	284.51	287.13	289.75
Defense	240.73	225.15	201.20	186.16	186.16	186.16	186.16	186.16
Non-defense	87.26	88.28	90.30	93.00	95.69	98.35	100.97	103.58
State and local Government	496.59	512.29	533.78	554.20	574.63	594.87	614.94	635.02
Gross Domestic Product	4174.05	4344.12	4593.34	4771.10	4964.77	5143.49	5338.10	5529.87

Financial Variables

Savings rate	4.30	4.63	4.73	3.79	4.00	4.13	4.28	4.60
3 mo. Treasury bill rate	3.90	5.14	4.44	3.88	3.93	4.02	4.24	4.70
10 year Treasury bond rate	7.50	7.10	6.36	6.28	6.45	6.64	6.82	7.21

Deficit Reduction--Consumption

Employment

	1992	1993	1995	1997	1999	2001	2003	2005
Unemployment rate	6.75	6.25	5.70	5.63	5.43	5.44	5.14	4.85
Unemployed, millions of people	8.57	8.09	7.65	7.75	7.67	7.87	7.60	7.32
Civilian jobs (millions)	123.73	126.74	131.91	135.45	139.07	142.39	145.80	149.07
Private sector jobs	104.62	107.41	112.14	115.25	118.45	121.39	124.49	127.44
Agric,Mining,Structures	10.06	10.45	11.01	11.25	11.58	11.82	12.10	12.33
Durable goods mfg	10.93	11.31	11.87	11.76	11.84	11.88	11.94	12.03
Non-durable goods mfg	7.86	7.92	7.98	7.93	7.86	7.76	7.66	7.56
Transp,Communic,Utilities	6.41	6.51	6.71	6.79	6.90	7.02	7.12	7.23
Trade	28.30	28.81	30.08	31.08	31.94	32.75	33.60	34.37
Finance,Insurance,Real Est	7.47	7.72	8.14	8.46	8.75	9.03	9.30	9.56
Medicine & Education	15.06	15.32	15.96	16.62	17.22	17.81	18.46	19.07
Domestic servants	1.42	1.42	1.42	1.41	1.40	1.40	1.39	1.38
Business,Repair,Oth ser	17.38	17.95	18.97	19.96	20.97	21.93	22.92	23.91
Civilian govt. jobs	19.12	19.33	19.77	20.20	20.62	20.99	21.31	21.62
Federal defense	0.85	0.82	0.79	0.79	0.79	0.79	0.79	0.79
Military jobs	1.99	1.88	1.74	1.72	1.72	1.72	1.72	1.72
Labor Productivity	12.97	13.15	13.36	13.58	13.80	14.01	14.23	14.46
Civilian Labor Force (millions)	126.90	129.40	134.08	137.67	141.17	144.65	147.77	150.73

3. Other Government--Consumption

Gross Domestic Product: Components

	1992	1993	1995	1997	1999	2001	2003	2005
	—	—	—	—	—	—	—	—
Personal Consumption Expenditures	2743.42	2792.66	2886.56	3013.32	3119.58	3233.78	3343.32	3449.79
Gross Private Domestic Investment	662.39	785.81	874.81	895.41	956.66	1006.30	1055.69	1105.10
Structures	260.37	298.62	336.67	360.26	378.70	392.58	408.29	419.27
Producers' durable equ	385.09	452.50	510.55	513.42	555.30	591.66	625.74	664.05
Inventory change	16.93	34.69	27.59	21.72	22.66	22.06	21.66	21.78
Exports of goods & ser	676.13	706.64	759.90	807.56	849.40	891.43	940.76	996.83
Imports of goods & ser	713.15	750.11	788.42	822.25	865.47	908.67	949.80	991.85
Federal Government	824.58	841.26	864.63	887.53	910.65	933.56	956.24	978.93
Federal	327.99	328.97	330.85	333.33	336.02	338.68	341.30	343.91
Defense	240.73	225.15	201.20	186.16	186.16	186.16	186.16	186.16
State and local Government	496.59	512.29	533.78	554.20	574.63	594.87	614.94	635.02
Gross Domestic Product	4174.05	4362.46	4592.48	4775.86	4964.84	5150.40	5340.06	5532.74

Financial Variables

Savings rate	4.30	4.92	6.04	5.54	5.79	5.98	6.27	6.66
3 mo. Treasury bill rate	3.90	5.31	4.62	4.16	4.00	4.06	4.30	4.80
10 year Treasury bond	7.50	7.20	6.52	6.43	6.48	6.63	6.85	7.25

Other Government--Consumption

Employment

	1992	1993	1995	1997	1999	2001	2003	2005
Unemployment rate	6.75	6.01	5.67	5.53	5.46	5.39	5.12	4.82
Unemployed, millions of	8.57	7.77	7.60	7.61	7.71	7.79	7.57	7.26
Civilian jobs (million	123.73	127.05	131.96	135.59	139.03	142.47	145.83	149.12
Private sector jobs	104.62	107.73	112.18	115.40	118.41	121.48	124.53	127.50
Agric,Mining,Structure	10.06	10.47	11.04	11.30	11.62	11.88	12.15	12.37
Durable goods mfg	10.93	11.37	11.89	11.81	11.88	11.95	11.99	12.07
Non-durable goods mfg	7.86	7.94	7.99	7.94	7.86	7.77	7.67	7.57
Transp,Communic,Utilities	6.41	6.52	6.73	6.81	6.92	7.03	7.14	7.25
Trade	28.03	28.84	29.84	30.78	31.57	32.42	33.26	34.05
Finance,Insurance,Real	7.47	7.73	8.12	8.45	8.73	9.02	9.28	9.55
Medicine & Education	15.06	15.37	16.05	16.74	17.29	17.89	18.53	19.15
Domestic servants	1.42	1.42	1.42	1.41	1.40	1.40	1.39	1.38
Business,Repair,Oth ser	17.38	18.07	19.11	20.17	21.15	22.13	23.11	24.11
Civilian govt. jobs	19.12	19.55	20.32	20.94	21.36	21.72	22.02	22.33
Federal defense	0.85	0.82	0.79	0.79	0.79	0.79	0.79	0.79
Military jobs	1.99	1.88	1.74	1.72	1.72	1.72	1.72	1.72
Labor Productivity	12.97	13.16	13.35	13.56	13.79	14.00	14.22	14.44
Civilian Labor Force (millions)	126.90	129.40	134.08	137.67	141.17	144.65	147.77	150.73

Deficit Reduction--Investment

Employment

	1992	1993	1995	1997	1999	2001	2003	2005
Unemployment rate	6.74	6.31	6.35	6.43	6.31	6.44	6.11	5.86
Unemployed, millions of people	8.56	8.17	8.51	8.85	8.90	9.31	9.03	8.84
Civilian jobs (millions)	123.74	126.66	131.05	134.35	137.84	140.94	144.37	147.55
Private sector jobs	104.62	107.33	111.28	114.15	117.22	119.95	123.06	125.92
Agric,Mining,Structures	10.06	10.45	10.97	11.25	11.59	11.83	12.10	12.33
Durable goods mfg	10.93	11.30	11.75	11.67	11.81	11.87	11.96	12.06
Non-durable goods mfg	7.86	7.92	7.94	7.87	7.80	7.71	7.62	7.53
Transp,Communic,Utilities	6.41	6.51	6.67	6.73	6.85	6.95	7.06	7.17
Trade	28.03	28.78	29.79	30.66	31.42	32.14	32.98	33.70
Finance,Insurance,Real Est	7.47	7.71	8.09	8.39	8.67	8.93	9.20	9.46
Medicine & Education	15.06	15.32	15.84	16.43	16.95	17.48	18.12	18.69
Domestic servants	1.42	1.42	1.42	1.41	1.40	1.40	1.39	1.38
Business,Repair,Oth ser	17.38	17.93	18.82	19.75	20.73	21.65	22.64	23.61
Civilian govt. jobs	19.12	19.33	19.77	20.20	20.62	20.99	21.31	21.62
Federal defense	0.85	0.82	0.79	0.79	0.79	0.79	0.79	0.79
Military jobs	1.99	1.88	1.74	1.72	1.72	1.72	1.72	1.72
Labor Productivity	12.97	13.14	13.37	13.61	13.88	14.11	14.34	14.57
Civilian Labor Force (millions)	126.90	129.40	134.08	137.67	141.17	144.65	147.77	150.73

4. Deficit Reduction–Investment

Gross Domestic Product: Components

	1992	1993	1995	1997	1999	2001	2003	2005
	—	—	—	—	—	—	—	—
Personal Consumption Expenditures	2743.42	2788.46	2892.74	3008.78	3107.65	3208.82	3316.79	3415.26
Gross Private Domestic Investment	662.39	776.65	868.28	895.43	962.24	1003.45	1056.82	1105.33
Structures	260.37	299.52	340.72	368.58	389.06	401.07	416.61	427.39
Producers' durable equ	385.09	443.29	499.96	504.67	549.85	580.65	618.22	655.81
Inventory change	16.93	33.85	27.60	22.18	23.33	21.73	21.99	22.13
Exports of goods & services	676.13	706.71	761.13	811.53	857.25	902.95	955.89	1015.92
Imports of goods & services	713.15	744.21	781.16	809.18	849.48	886.80	926.68	965.00
Federal Government	327.99	313.43	291.50	279.16	281.86	284.51	287.13	289.75
Defense	240.73	225.15	201.20	186.16	186.16	186.16	186.16	186.16
Non-defense	87.26	88.28	90.30	93.00	95.69	98.35	100.97	103.58
State and local Government	496.59	512.29	533.78	554.20	574.63	594.87	614.94	635.02
Gross Domestic Product	4174.05	4339.50	4560.73	4733.05	4926.45	5099.80	5296.29	5487.44

Financial Variables

Savings rate	4.30	4.65	4.98	4.33	4.67	4.77	5.00	5.33
3 mo. Treasury bill rate	3.90	5.06	3.84	2.80	2.49	3.26	3.58	4.00
10 year Treasury bond rate	7.50	7.05	6.04	5.54	5.50	5.64	5.80	6.09

5. Tax Cut–Investment

Gross Domestic Product: Components

	1992	1993	1995	1997	1999	2001	2003	2005
Personal Consumption Expenditures	2743.42	2794.44	2911.34	3045.75	3163.44	3289.10	3403.77	3518.47
Gross Private Domestic Investment	662.39	792.95	925.00	969.67	1027.58	1074.60	1117.50	1167.45
Structures	260.37	299.29	342.68	367.32	384.64	397.63	412.25	423.63
Producers' durable equ	385.09	458.83	552.60	578.72	619.31	654.27	683.48	721.72
Inventory change	16.93	34.83	29.72	23.63	23.63	22.70	21.77	22.10
Exports of goods & services	676.13	706.83	761.67	811.49	854.65	896.71	945.08	999.92
Federal Government	824.58	825.72	825.28	833.36	856.48	879.39	902.07	924.76
Federal	327.99	313.43	291.50	279.16	281.86	284.51	287.13	289.75
Defense	240.73	225.15	201.20	186.16	186.16	186.16	186.16	186.16
State and local Government	496.59	512.29	533.78	554.20	574.63	594.87	614.94	635.02
Gross Domestic Product	4174.05	4356.14	4619.26	4817.82	5015.75	5208.79	5396.55	5594.53

Financial Variables

Savings rate	4.30	4.74	5.51	4.99	5.15	5.21	5.43	5.71
3 mo. Treasury bill rate	3.90	5.19	4.34	3.77	3.82	4.13	4.50	5.08
10 year Treasury bond rate	7.50	7.12	6.25	6.13	6.38	6.71	7.03	7.46

Tax Cut--Investment

Employment

	1992	1993	1995	1997	1999	2001	2003	2005
Unemployment rate	6.75	6.18	5.75	5.66	5.57	5.51	5.30	5.01
Unemployed, millions of people	8.56	7.99	7.71	7.79	7.87	7.97	7.84	7.55
Civilian jobs (millions)	123.74	126.83	131.85	135.41	138.88	142.28	145.56	148.83
Private sector jobs	104.62	107.50	112.08	115.22	118.26	121.29	124.25	127.21
Agric,Mining,Structures	10.06	10.44	10.98	11.19	11.46	11.68	11.92	12.13
Durable goods mfg	10.93	11.36	12.02	12.01	12.06	12.09	12.09	12.14
Non-durable goods mfg	7.86	7.92	7.97	7.91	7.84	7.74	7.64	7.53
Transp,Communic,Utilities	6.41	6.51	6.70	6.78	6.88	6.99	7.09	7.20
Trade	28.03	28.83	30.03	31.02	31.85	32.72	33.56	34.36
Finance,Insurance,Real Est	7.47	7.72	8.12	8.44	8.73	9.02	9.29	9.55
Medicine & Education	15.06	15.33	15.91	16.55	17.14	17.77	18.44	19.08
Domestic servants	1.42	1.42	1.42	1.41	1.40	1.40	1.39	1.38
Business,Repair,Oth ser	17.38	17.96	18.94	19.92	20.90	21.89	22.85	23.85
Civilian govt. jobs	19.12	19.33	19.77	20.20	20.62	20.99	21.31	21.62
Federal defense	0.85	0.82	0.79	0.79	0.79	0.79	0.79	0.79
Military jobs	1.99	1.88	1.74	1.72	1.72	1.72	1.72	1.72
Labor Productivity	12.97	13.17	13.43	13.70	13.95	14.20	14.42	14.66
Civilian Labor Force (millions)	126.90	129.40	134.08	137.67	141.17	144.65	147.77	150.73

6. Other Government--Investment

Gross Domestic Product: Components

	1992	1993	1995	1997	1999	2001	2003	2005
Personal Consumption Expenditures	2743.42	2793.28	2892.14	3022.54	3130.63	3247.91	3360.36	3469.52
Gross Private Domestic Investment	662.39	786.38	879.83	902.11	963.09	1014.55	1066.21	1117.17
Structures	260.37	298.72	337.94	362.39	381.21	395.72	411.98	423.58
Producers' durable equ	385.09	452.91	513.92	517.63	558.99	596.42	632.14	671.34
Inventory change	16.93	34.75	27.97	22.09	22.89	22.41	22.08	22.26
Exports of goods & services	676.13	706.70	760.39	808.90	851.64	894.54	944.76	1001.84
Imports of goods & services	713.15	750.37	790.27	824.50	867.30	910.99	952.63	994.91
Federal Government	824.58	841.26	864.63	887.53	910.65	933.56	956.24	978.93
Federal	327.99	328.97	330.85	333.33	336.02	338.68	341.30	343.91
Defense	240.73	225.15	201.20	186.16	186.16	186.16	186.16	186.16
State and local Government	496.59	512.29	533.78	554.20	574.63	594.87	614.94	635.02
Gross Domestic Product	4174.05	4363.42	4601.58	4790.60	4982.38	5173.12	5368.23	5565.86

Financial Variables

Savings rate	4.30	4.91	6.00	5.46	5.69	5.83	6.10	6.45
3 mo. Treasury bill rate	3.90	5.30	4.59	4.07	3.88	3.92	4.14	4.59
10 year Treasury bond rate	7.50	7.19	6.47	6.34	6.39	6.52	6.73	7.12

Other Government–Investment

Employment

	1992	1993	1995	1997	1999	2001	2003	2005
Unemployment rate	6.75	6.03	5.69	5.58	5.53	5.47	5.21	4.92
Unemployed, millions of people	8.57	7.80	7.63	7.68	7.81	7.91	7.69	7.42
Civilian jobs (millions)	123.73	127.03	131.93	135.52	138.93	142.35	145.70	148.96
Private sector jobs	104.62	107.70	112.16	115.33	118.31	121.36	124.40	127.34
Agric,Mining,Structures	10.06	10.47	11.02	11.26	11.57	11.82	12.08	12.29
Durable goods mfg	10.93	11.37	11.90	11.81	11.88	11.95	12.00	12.08
Non-durable goods mfg	7.86	7.93	7.98	7.93	7.85	7.76	7.66	7.56
Transp,Communic,Utilities	6.41	6.52	6.73	6.80	6.90	7.01	7.12	7.22
Trade	28.03	28.83	29.84	30.77	31.55	32.40	33.24	34.02
Finance,Insurance,Real Est	7.47	7.73	8.12	8.45	8.73	9.02	9.29	9.55
Medicine & Education	15.06	15.36	16.05	16.75	17.31	17.90	18.55	19.17
Domestic servants	1.42	1.42	1.42	1.41	1.40	1.40	1.39	1.38
Business,Repair,Oth ser	17.38	18.06	19.10	20.15	21.12	22.11	23.08	24.07
Civilian govt. jobs	19.12	19.33	19.77	20.20	20.62	20.99	21.31	21.62
Federal defense	0.85	0.82	0.79	0.79	0.79	0.79	0.79	0.79
Military jobs	1.99	1.88	1.74	1.72	1.72	1.72	1.72	1.72
Labor Productivity	12.97	13.17	13.38	13.62	13.86	14.09	14.32	14.56
Civilian Labor Force (millions)	126.90	129.40	134.08	137.67	141.17	144.65	147.77	150.73

Quest Simulation Results

GROSS DOMESTIC PRODUCT AND COMPONENTS
Constant 1987 Dollars

	1992	1993	1994	1995	1996
Gross domestic product					
No Defense Cuts	4924.9	5097.6	5291.8	5456.9	5583.6
Deficit Reduction	4924.9	5080.0	5253.5	5428.2	5582.3
Other Government	4924.9	5096.0	5290.1	5454.5	5580.7
Personal Income Tax Cul	4924.9	5089.6	5280.4	5456.8	5586.4
Personal consumption					
No Defense Cuts	3290.7	3401.6	3531.6	3648.0	3752.8
Deficit Reduction	3290.7	3397.4	3519.7	3632.4	3740.3
Other Government	3290.7	3400.0	3529.4	3645.9	3750.3
Personal Income Tax Cul	3290.7	3407.0	3549.3	3680.2	3795.7
Gross investment					
No Defense Cuts	713.9	769.3	837.1	878.6	894.5
Deficit Reduction	713.9	765.4	831.0	882.4	913.0
Other Government	713.9	770.3	840.6	882.1	898.0
Personal Income Tax Cul	713.9	768.3	838.6	887.7	906.1
Net export					
No Defense Cuts	-13.7	•25.7	-51.8	-66.7	-80.7
Deficit Reduction	•13.7	-22.2	-41A	-44.4	-38.8
Other Government	-13.7	-26.8	-54.7	-70.6	-84.7
Personal Income Tax Cul	•13.7	-25.0	-51.8	-68.8	-83.2
Federal					
No Defense Cuts	369.2	368.4	371.4	374.4	377.1
Deficit Reduction	369.2	355.2	340.8	335.0	327.9
Other Government	369.2	368.4	371.4	374.4	377.1
Personal Income Tax Cui	369.2	355.2	340.8	335.0	327.9
Non-defense					
No Defense Cuts	103.9	106.9	109.9	112.9	115.6
Deficit Reduction	103.9	106.9	109.9	112.9	115.6
Other Government	103.9	120.1	140.5	152.3	164.8
Personal Income Tax Cul	103.9	106.9	109.9	112.9	115.6
State and local					
No Defense Cuts	564.8	584.1	603.4	622.8	639.9
Deficit Reduction	564.8	564.1	603.4	622.8	639.9
Other Government	564.8	584.1	603.4	622.8	839.9
Personal Income Tax Cul	564.8	564.1	603.4	622.8	639.9

OTHER VARIABLES

	1992	1993	1994	1995	1996
FRB Industrial Production					
No Defense Cuts	109.4	113.8	119.0	122.9	125.1
Deficit Reduction	109.4	113.5	118.3	122.8	126.1
Other Government	109.4	113.9	119.4	123.4	125.7
Personal Income Tax Cut	109.4	113.7	118.8	123.1	125.4
Inflation rate of dgdp					
No Defense Cuts	2.3	1.7	1.9	2.5	3.2
Deficit Reduction	2.3	1.7	1.5	1.9	2.6
Other Government	2.3	1.7	1.9	2.5	3.2
Personal Income Tax Cul	2.3	1.7	1.8	2.4	3.1
Private labor productivity					
No Defense Cuts	0.1	0.1	0.1	0.1	0.1
Deficit Reduction	0.1	0.1	0.1	0.1	0.1
Other Government	0.1	0.1	0.1	0.1	0.1
Personal Income Tax Cul	0.1	0.1	0.1	0.1	0.1
Treasury bill rate					
No Defense Cuts	3.3	2.4	2.8	3.7	4.5
Deficit Reduction	3.3	2.2	2.2	2.8	3.7
Other Government	3.3	2.4	2.8	3.7	4.5
Personal Income Tax Cut	3.3	2.3	2.6	3.5	4.4
Moody's Aaa bond yield					
No Defense Cuts	7.6	6.4	6.0	6.3	7.0
Deficit Reduction	7.6	6.3	5.7	5.8	6.3
Other Government	7.6	6.3	6.0	6.3	7.0
Personal Income Tax Cut	7.6	6.3	5.9	6.2	6.9
Crude unemployment rate					
No Defense Cuts	7.5	7.2	6.4	5.6	5.4
Deficit Reduction	7.5	7.4	6.8	6.1	5.6
Other Government	7.5	7.2	6.4	5.7	5.4
Personal Income Tax Cut	7.5	7.3	6.5	5.7	5.4
Civilian labor force					
No Defense Cuts	126.2	128.0	130.0	132.0	133.8
Deficit Reduction	126.2	128.0	130.1	132.2	134.1
Other Government	126.2	128.0	130.1	132.2	134.1
Personal Income Tax Cut	126.2	128.0	130.1	132.2	134.1

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